



AGRICULTURAL RESEARCH INSTITUTE

PUSA

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OF INDIA.

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EXPLANATION OF THE PLATES.

Page 91.

The numbers attached to each of the accompanying figures correspond with those of Mr. Visger's list. The unnumbered figure of the set is taken from a specimen in my (Dr. Wight's) collection of a large sized Lichen, rather abundant on the branches of trees in the Hill Jungles; but which does not give out any colour to ammonia.

Explanation of the Plates belonging to Dr. Griffith's paper ; page 104.

Plate A. Camellia Caudata. Wall.

1. Flower bud.
2. Flower.
3. Corolla and stamina ; corolla laid open.
4. Stamen, outer view.
5. Anther and apex of filament, inner view.
6. Pollen.
7. Pistillum.
8. Division of style with its stigma.
9. One cell of the ovarium laid open, shewing the number and situation of the ovula.
10. Ovarium transverse section.
11. Portion of Placenta with two ovula, shewing their different directions.
12. Ovulum.
13. Ditto, longitudinal section through the testa.
14. Capsule.
15. Seed viewed on its upper surface shewing the hilum and micropyle.
16. Ditto, longitudinal section through the testa.
17. Ditto, seed removed shewing the arachnoid appearance presented by the vessels of the testa.
18. Embryo parallel to the cotyledons.
19. Ditto parallel to the smaller diameter of the cotyledons.
20. Ditto one of the cotyledons removed.

Plate B. Camellia sp. from the Khasiya Hills. An Camellia? oleifolia. Wall? page 104.

1. Capsule, while moistened.
2. Ditto, dry.
3. Seed.
- 4 & 5. Embryo.
6. Ditto, cotyledon removed.

Plate C. Camellia Theifera, page 104.

The drawings of the flower, &c. are from dried Assamese specimens of the fruits, &c. from Chinese specimens.

1. Very young flower bud.
2. Bud more advanced.
3. Flower.
4. Ditto, viewed posteriorly.
5. Corolla removed, viewed posteriorly.
6. Petal, with portion of the stamens cohering with its base and with each other.
7. Petal, stamina removed, viewed as a transparent object, shewing the venation.
8. Anther and portion of filament, viewed exteriorly.
9. Ditto, viewed interiorly, connectivum slightly dilated in order to shew the insertion or attachments of the filament.
10. Ovarium, style and stigmata; two sepals removed.
10. Apex of a division of the style shewing the structure of the stigma.
11. Ovarium, transverse section.
12. Ditto, one of the cells laid open to shew the situation, &c. of the ovula.
13. Longitudinal bi-section of the ovarium wall of one cell incomplete, shewing the different directions of the ovula and their foramina.
14. Longitudinal section of the ovulum *a* testa *b* nucleus entire.
15. Fruit viewed posteriorly.
16. Ditto, viewed anteriorly, seeds in their situation; in one cell two have been developed.
17. Fruit: seeds removed, shewing its loculicidal mode of dehiscence, and the axis remaining in situ.

18. Seed.
19. Internal view of testa shewing the ramification of the chalaza.
20. Section of seed shewing the situation of the embryo.
21. Embryo viewed parallel to the greater diameters of the cotyledons.
- 21.*a* Ditto, viewed parallel to the smaller diameter of the cotyledons.
22. Cotyledon, radicle and plumula.

The drawing of the Green Tea Plant in the Botanical Magazine, new series, t. 3148, represents the stamina erroneously, particularly as regards the attachment of the filament. The mistake concerning the ovula, two of which are said to exist in each cell, has originated from a transverse section having been alone employed in ascertaining its structure.

TRANSACTIONS
OF THE
AGRICULTURAL AND HORTICULTURAL SOCIETY
OF INDIA.

I.—*On the Soils of Nepaul, sent by Dr. CAMPBELL, with remarks on the same by Mr. J. W. MASTERS.*

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I have the pleasure of sending you the original eight specimens of soil, from which my notice of them was taken, and recorded in the agricultural notes recently forwarded to you by Government. This will enable the members of the Society to compare these soils with my imperfect account of them, and to supply deficiencies or correct mistakes.

I take the liberty of recommending to you some particular observation as to the chemical analysis of some of the members, the specimen now sent of the “black earthy manure” (elo 7.) This substance is one of great importance in the husbandry of this valley, so that I need scarce say that a correct ascertainment of its nature would be of great interest to me; whether the same should tend to confirm or refute the notion I have formed of it from Mr. STEPHENSON’S analysis, and personal examination.

I have preferred forwarding the original specimens, the better to enable the Society to correct mistakes, or to rectify my notice of their soils.

Should the Committee determine on giving a place to my paper in the Society's Transactions, may I request of you to furnish the proof sheets to me for correction of the press, and for such amendments as I may be enabled to make.

In the event of your Society not having the privilege of forwarding sheets for correction free of postage, I hope you will be so kind, as send them to Mr. Maddock (now in Calcutta) who will forward them to me at the least necessary cost.

Yours very truly,

A. CAMPBELL.

Nepaul, April 19th, 1837.

TO N. WALLICH, ESQ. M. D.

DEAR SIR,

At the last meeting of the Agricultural Society, I was desired by the Vice President, (and I think at your suggestion,) to furnish an analysis of the specimens of soil sent from Nepaul by Dr. CAMPBELL. I now have the pleasure to forward for your inspection, *not* a "Chymical Analysis," but a few simple remarks, yet, I trust, such as will not be altogether unacceptable to the Society. You must be aware that I have neither time nor apparatus, nor am I sufficiently acquainted with chymistry to be enabled to furnish an analysis that might be depended upon. I have examined the soils in a dry state, comparing them with others, the qualities of which I am acquainted with. I have endeavoured to ascertain their specific gravities, their powers of absorption, and their principal ingredients. I have separated the components by simple washing in water, and have put them up in separate papers numbering them agreeably to the numbers furnished by Dr. CAMPBELL.

I hope I shall not be misunderstood when speaking of a *good* or a *bad* soil. I have had but a very small quantity to examine, and it would be absurd in the extreme, should I pretend to decide upon the fertility, or infertility of a large tract of land, after merely examining a tea spoonful of the soil. I think it very desirable that the Society should procure fair samples of good and bad soils, and of such as are known to be suitable to the

growth of particular crops ; it would enable us to add manure with much more advantage.

I am,
Sir,
Yours respectfully,
J. W. MASTERS.

Botanical Garden, June 7th, 1837.

Remarks on eight specimens of Soil from the Valley of Nepaul.

The remarks immediately following the Nos. and included within inverted commas, were copied from the papers containing the specimens and were made by Dr. A. CAMPBELL, by whom the specimens of soil were sent to the Secretary of the Agricultural and Horticultural Society.

The soils were received in a dry state, in paper ; were opened on a hot, dry day, viz. the 13th May ; were all weighed, and exposed to the sun at the same time, viz. at 12 at noon, and in the same state as received ; were taken in at 4 P. M. and reweighed ; were all put out in the dew at 12 at night, and taken in at 5 the next morning and reweighed. There was comparatively but little dew on that night. No. 1. Specimen of the soil from the upper level to the N. W. of Patun Durwaya, is very fertile, yielding splendid crops annually of wheat, and transplanted rice. Does not effervesce with muriatic acid, is exquisitely fine, very little sand.

In powder, whitish brown, slightly glimmering, particles exquisitely fine, smell somewhat earthy. Spec. Grav. 1. 9.

Comp: Transparent quartz, mica, and a variety of earthy minerals, with a small portion of vegetable matter. 400 grains during four hours exposure to the midday sun, lost 5 grains ; and during five hours exposure to the night dew, gained 8 grains. *Absorbent.*

A fine sandy soil, suitable for potatoes, carrots, radishes, and such herbaceous plants as produce large leaves, and have numerous small hair-like roots growing near the surface. Manure with Nos. 6 and 7 with lime, clay, or any mixture of animal and vegetable matter.

We have soil similar to this in the Botanic Garden, in which indigenous plants thrive luxuriantly. The fertility depends on the fineness of the particles, in this specimen.

No. 2. Specimen of the greyish soil from the higher level on the Sheopore road, $\frac{1}{2}$ mile from Presidency; grows gohya, wheat, and transplanted rice; does not effervesce with muriatic acid, contains much mica, and fine sand.

In powder, greyish, glittering, soft, particles, very fine. Spec. Grav. 1. 8.

Comp: Transparent quartz, mica and various earthy and alkaline minerals, with about one per cent. vegetable fibre.

400 grains during four hours exposure to the midday sun, lost 4 grains; and during five hours exposure to the night dew gained 10 grains. *Absorbent*. A light sandy soil easily worked; suitable for corn, and kitchen garden crops. Manure with No. 6 and 7 with lime, or any mixture of animal and vegetable matter. A thick sown crop of spinach, cabbage, or any leaf plant, dug in just before the plant blossoms, would be a good dressing for this soil.

The sub soil in some part of the Botanic garden is similar to this; indigenous fruit and forest trees thrive in it.

No. 3. Specimen of a greyish coloured soil of the lower level, taken from the field on the right side of the road to Ballajee, this side of the river. Bears annually large crops of transplanted rice and wheat. Is slightly tinged with iron. When not in powder, does not effervesce with muriatic acid.

In powder, greyish, glittering, roughish, smell somewhat earthy. Spec. Grav. 1. 7.

Comp: Transparent quartz, mica, and a variety of earthy, alkaline, and calcareous minerals, with about $2\frac{1}{2}$ per cent. vegetable matter.

400 grains during four hours exposure to the midday sun lost $4\frac{1}{2}$ grains; and during five hours exposure to the night dew, gained $7\frac{3}{4}$ grains. *Absorbent*.

With an occasional dressing of No. 6 and 7, this soil may be made to produce any kind of corn crop. It is deficient in lime and clay.

No. 4. Specimen of the reddish clay soil, from the higher level on the Sheepore road, near the bamboo tope. Grows *murwa* and *mukii* admirably. Effervesces very slightly with muriatic acid. November 30th, 1836.

In small lumps, brownish, roughish, adhesive, absorbent, smell earthy. Spec. Grav. 2. 2.

Comp: Calcareous, and feruginous sand, mixed with small particles of mica; about one-fourth clay, very little vegetable matter.

400 grains during four hours exposure to the mid-day sun, lost 16½ grains; and during five hours exposure to the night dew, gained 17 grains. *Eminently absorbent.*

This specimen contains the basis of a good soil. Manure with No. 6 and 7.

No. 5. Specimen of the red ochray earth from Nagoejun, used as a paint for houses by Pacbuthals. Is not fertile except for *mukii* and *murwa*. Does not effervesce with muriatic acid.

In lumps, red, rough, adhesive; smell earthy. Spec. Grav. 2. 6.

Comp: About three-fourths feruginous sand, and one-fourth clay, including one per cent. black chalk. The latter is probably foreign.

400 Grains during four hours exposure to the mid-day sun, lost three grains; and during five hours exposure to the night dew gained 11½ grains. *Absorbent.*

A poor, hungry soil, containing probably from 10 to 15 per cent. of red oxide of iron. Either of the preceding Nos. would improve this; and if well manured with No. 4. or 8, it may be made to grow tobacco and the tea plant. It bears some resemblance to the red soils in the neighbourhood of Macao.

No. 6. The yellow clay manure. Does not effervesce with muriatic acid.

In powder, whitish brown, glittering, soft, greasy, adhesive, absorbent, smell earthy. Spec. Grav. 2.

Comp: Exquisitely fine sand, and unctuous clay, in nearly equal quantities, including a little mica.

370 grains during four hours exposure to the mid-day sun, lost 6 grains; and during five hours exposure to the night dew gained 14½ grains. *Eminently absorbent.*

A good dressing of this would highly improve Nos. 1, 2, 3, and 5.

No. 7. The black manure. Does not effervesce with muriatic acid.

Solid, opaque, colour blackish grey; somewhat slaty; structure earthy; soils the fingers; leaves a dull mark on paper; turns red in the fire; falls to pieces in water. Spec. Grav. 1. 8. Black chalk, or graphitic slate.

Comp: About two-thirds silicious sand mixed with mica; and nearly equal quantities of clay and carbon; a very little oxide of iron.

290 grains (in a solid state) during four hours exposure to the mid-day sun lost 5 grains; and during five hours exposure to the night dew, gained 11 grains. *Eminently absorbent.*

This is particularly well adapted as a manure to the first five numbers.

Has it ever been applied to any other purpose?

Would it not answer for crayons?

Is there any coal in the neighbourhood?

No. 8. Sample of yellow soil from the lower level between the Presidency and Ballajee road. Gives wheat and maize annually. This soil does not effervesce with muriatic acid.

In powder, light brown, glittering, roughish, adhesive, smell earthy. Spec. Grav. 1. 7.

Comp: Quartz, mica, oxide of iron, and various earthy, alkaline, and calcareous minerals; with about ten per cent. of unctuous clay.

400 grains during four hours exposure to the mid-day sun, lost 2 grains; and during five hours exposure to the night dew gained $6\frac{1}{2}$ grains. *Absorbent.*

A good light soil, suited to corn, kitchen garden crops, and to any herbaceous plant, that prefers a light soil. It is deficient in lime and vegetable matter. Manure with Nos. 6 and 7.

J. W. MASTERS.

Botanical Garden, June 6th, 1837.

TO JOHN BELL, Esq.

Secretary to the Agricultural and Horticultural Society.

DEAR SIR,

I have the pleasure to forward specimens of the three primitive earths which form the principal ingredient in all soils; others are occasionally met with, but they exist in small quantities, and very little is known about their effects. I also forward specimens of two soils, which are in part artificial, but which may serve to compare real soils with, as they contain all that is necessary to form the basis of a good soil.

No. 1. Silex, under this term I include every possible kind of sand or gravel, the specimen is sea sand from Singapore.

No. 2. Clay, nearly pure and feruginous.

No. 3. Chalk, nearly pure carbonate of lime. This effervesces briskly with lime juice.

No. 1a. Exquisitely fine sand mixed with mica from the Society's Nursery in the Botanic Garden, taken six inches below the surface.

No. 2a. Nearly pure clay from the Society's Nursery in the Botanic Garden, taken six inches below the surface.
These two compose the soil in the Society's ground.

No. 1b. Sand from the China tea soils.

No. 2b. Feruginous clay from the China tea soils. These two compose the tea soil, at least *that* specimen from which *they* were taken; there was a little vegetable matter, but it was evidently foreign to the soil.

No. 4. Specimen of a soil composed of

Fine sand,	No. 1a,	2 parts,	(200 grains.)
Clay,	No. 2a,	1 part,	(100 „)
Chalk,	No. 3,	1 part,	(100 „)

This soil effervesces with lime juice.

No. 5. Specimen of a soil containing a small quantity of iron, composed of,

Sand,	No. 1b,	2 parts,	(200 grains.)
Clay,	No. 2b,	1 part,	(100 „)
Chalk,	No. 3,	1 part,	(100 „)

This soil effervesces with lime juice.

As the exact quantity of each primitive is known, these two

specimens may serve for comparison, by their appearance, their feel, their smell, and by the manner in which they effervesce with lime juice. I have named lime juice, because it is easily obtained in this country, and may be used by any one without danger.

Perhaps I shall be ridiculed by some for having forwarded to the Agricultural Society of India, specimens of common sand, clay, and chalk; for every one is acquainted with these substances, and every one knows that they are to be found in soils; this I admit, and I hope it will also be admitted that very little else is to be found in soils. The animal and vegetable matter found near the surface, whether it has been deposited intentionally or by accident cannot be said to belong originally to the soil. About 16 years ago I examined a field at Brompton in Kent, belonging to a butcher, the soil of which might with propriety be called "Animal soil," owing to the immense quantities of animal matter continually added to it. But that will wear out, unless constantly renewed, while the gravel, the clay and the chalk will remain, as will the oxide of iron which was visible enough in all the surrounding fields.

I have personally examined the soil at many places in several of the counties of England. The chalky soils in Kent; the gravelly and sandy soils in Kent, Essex and Sussex; the clayey soils in the weold; the swamps in the fens of Lincolnshire, and the iron soils in Yorkshire. In the county of Kent, (a highly cultivated district) there is scarce a field that I have not been into; and in cultivated soils I have always found one, or more of the three primitives to predominate; and for general purposes, it appears to me quite sufficient if we ascertain how much sand, how much clay, and how much lime there is in a soil, we may then add to it, what it is deficient in. I have thought these observations necessary for the better understanding of the remarks I lately forwarded through Dr. WALLICH on the Nepal soils.

I am, Sir,

Yours truly,

J. W. MASTERS.

Botanical Garden, June 12th, 1837.

II.—*Melons.*

The Silver Agricultural Medal and 200 Rupees were presented to Mr. A. MILLETT, of Entally, for his exertions in introducing a Melon, superior to the common "Footee" of Bengal; and in reference to the expense incurred in making the experiments, the following communications have been received from Mr. MILLETT, on the subject :—

TO J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

With deference, I take the liberty of sending you the accompanying six Musk Melons, cultivated by me at this place, and beg your acceptance of them. These Melons are called by the up-country natives "*Karmoojah*," and differ, I dare say, a great deal from the taste of the ordinary Melons of Bengal; they are uncommonly sweet and have an exquisite flavour. I do not suppose they were ever cultivated here, having never seen them in any of the markets.

My object in cultivating these experimental melons, was in consequence of their rarity, and I am happy to say they have answered pretty well. I regret much that I have not available means of extending and continuing the undertaking, but if I were assisted by the Agricultural and Horticultural Society, I am almost positive that I would succeed in bringing this Melon to perfection.

I have the honour to be,

Sir,

Your most obedient Servant,

A. MILLETT.

Entally, 18th April, 1837.

To J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

I have been duly favoured with your letter of the 13th instant, and in reply beg leave to submit a minute account of the time and mode I adopted in cultivating the Musk Melon. I observe with pleasure that the melons have been approved of as superior in flavour to any hitherto grown in Bengal.

It is extremely gratifying to my feelings, that my exertions in rearing them have been appreciated by the Society beyond my expectation. I beg you will be pleased to tender them my grateful thanks for the 200 Rs. and the silver medal they have awarded me for the successful developement of this plant.

In pursuance of my letter of the 9th instant, I beg to state for the Society's information the time and mode of culture, and the nature of the soil, as well as the manure, and proper care taken in cultivating it.

1st. The culture of Musk Melon requires light sandy soil, neither too high, nor too low, such as is adapted for the cultivation of country water melons, or of indigo; which is called in the Bengalee language *Dho-ans-mauttee*, that is to say, an admixture of clay and sand, procurable on the banks of the Ganges.

2d. The land must be tilled and properly manured before putting the seed in the ground, at the distance of five cubits from each other, and allowing the plant to creep of itself on the ground without any support whatever, and watering it as often as requisite till the fruits come to maturity. The fruits commence ripening in the beginning of April.

3d. Proper care should be taken of weeding and inspecting the plant, that no worms, or insects should destroy its tender leaves, which is too apt to be the case, if overlooked.

4th. The seed must be sown on or before the 10th of February, which is the proper time of sowing, and it springs up within 6 or 7 days.

5th. Each plant yields on an average about a dozen fruits ; it may, perhaps, yield more, in sandy soils and favourable seasons.

6th. With regard to manuring the bed of melons, it may not be absolutely necessary, and would be too expensive, and unprofitable an undertaking—but if I used it, it was on account of the soil in the suburbs of Calcutta being hard and of a nitrous quality, and, therefore, not propitious for this culture, without the additional corrective I here allude to, I should not have succeeded in bringing it to the favourable notice of the Society.

7th. The manure I made use of, was purely of one or two years old cow-dung, procurable at all times from the breeders of cattle, which is called in the Bengalee language *Shawrmantee*, it may be had at the rate of two or three hackeries load for the rupee, (at least I paid for it at that rate,) and which I had used in my bed of melon : mixing it with sand and earth, digging and filling the holes with it a foot deep, and of six inches in circumference ; within two inches in depth of the prepared holes in which the seed should be sown. Previous to sowing the seed, the holes must be well moistened one day before, and watered occasionally. Two common baskets full of each sort, that is to say, two baskets of cow-dung, two of sand, and two of earth mixed together, are sufficient to fill up four holes in which eight plants may be sown, two in each hole, at the distance of 5 cubits from each other. These holes were purposely dug to enable the root to penetrate the deeper and sooner in the ground.

8th. The earthen pots you allude to were for the purpose of preserving the fruits, not only from resting on the ground, but that of securing them from attacks of worms and insects arising from the dampness of nitrous soil, which is too apt to stain and injure them. The fruits should be placed on the top and *not inside of the pots*, but it would be needless using them in sandy soils or dry lands, where they are not liable to such incidents. Upon the whole, I think, *chur* lands are preferable to any other.

I trust you will find the within minute detail, of time, mode, &c. &c., which I now submit for the information of the Society,

satisfactory; but if any other explanation should be deemed requisite, it would afford me the greatest pleasure in attending to, and communicating it to them.

I have the honour to be,

Sir,

Your most obedient Servant,

A. MILLETT.

Entally, 23d May, 1887.

TO J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

It is with the utmost pleasure I beg leave to send you herewith a few samples of Musk Melons, (eight in number) reared from a second crop on the same bed you have already inspected. I trust you will find them, probably, superior in flavour to those I sent you before, and beg your favouring me with your opinion on the subject.

It may perhaps appear surprising that the Melons should have improved in size, and flavour too, in opposition to the time of its proper growth, and that of yielding so late in the season; it may be attributed to its liability of producing two crops in the season in this part of the country, which I the least expected, and that it should have succeeded so well when I attempted resowing the same bed on the 13th of April last, with the same seed of the former crop.

I have in contemplation of sending some of these Melons for the inspection of the other members of your Committee.

It is necessary that I should mention to you the system I adopted in rearing them again, which of itself, is not of much consequence; it being the same as the former, but only differing a little in the mode I have already described to you. The approaching setting in of the rainy season had compelled me to make bamboo stages or *machans*, 6 inches in height from the ground to preserve the fruits, and allowing the plants at the same time to creep on them, and not to rest on the ground, on

the supposition that too much moisture might injure them. These stages or *machans* have not at all interfered with the vegetation; on the contrary, they appear to have improved it, and will apparently yield as many fruits as were gathered from the former sowing.

The fruits are sheltered with small earthen vessels, otherwise called *gomlahs* by the natives, to secure them from not being exposed to heavy rains. These vessels or *gomlahs* are supported by three bamboo sticks fixed in the ground a foot high, and underneath of which the fruits are sheltered, admitting throughout a free circulation of air on them.

It would be extremely gratifying to my feelings, if you could conveniently step over to inspect and ascertain the improvement the bed of Melons has attained, favouring me with previous notice of the day you intend visiting it.

I have the honour to be,

Sir,

Your most obedient Servant,

A. MILLETT.

Entally, 13th June, 1837.

NOTE.—These Melons were superior to the first crop—for which the medal and premium were awarded.—J. BELL.

Brigadier General SIR THOS. ANBUREY, *to the President, on the same subject.*

TO SIR E. RYAN, *Knt.* &c. &c. &c.

MY DEAR SIR EDWARD,

Although no longer a member of the Agricultural and Horticultural Society, I have lost nothing of my former warm interest in its successful progress and improvement in all its branches.

Observing in the *Englishman* of the 11th instant, a notice of the meeting of the Society, and proceedings relative to the rearing of musk melons by Mr. MILLETT, at Entally, I am induced to present you some seeds of a melon grown at a place called "Koosecapore," (close on a small sandy stream) about 10 miles from this station, on the road from here to Cawnpore (via Cal-

pee,) I have tasted several, and in flavour think that they approach very near to the rock melon of England; this melon has not the mealy qualities of the musk melon, at least, of all that I have tasted of that family in Bengal, and also in the North Western Provinces.

The fruit from which the accompanying seed was preserved, was of a bright greenish brown, darker (apparently) according to the age or time of gathering of the fruit, thickly speckled on the rind like the rock Cantalope, and of a deeper green at the divisions of the cloves; when cut, the flesh inside is of a bright orange colour (and in some) slightly tinged with deep yellow; the rind to the depth of $\frac{1}{10}$ of an inch of bright grass green, when thoroughly ripe the seed-cells are detached from the shell of the fruit, the flesh firm and juicy, in so much, that some desert spoonfuls were obtained from a slice or a cut of not more than the thickness of 4 or 5 inches, the sort is most decidedly superior to any class of melons I have yet seen in India, and equal to some from English seed, that were raised at Cawnpore in 1824-25 from English seed given to me by the late Mr. ROBERT GRANT. I am sanguine in the hope, that with care, and scientific management, this description of melon may be successfully cultivated in Calcutta.

The fruit from which this seed was taken, weighed upwards of $3\frac{1}{2}$ seers, and measured 2 feet $2\frac{1}{2}$ inches round the mean bulk, or circumference.

I have sent a few seeds from melons of the same quality, and equal flavour, previously and recently cut, to friends in Calcutta for distribution. Should the accompanying be productive, and prove an acquisition, I will gladly send more hereafter; it will afford the highest gratification to,

My dear Sir EDWARD,

Yours, &c.

(Signed) THOS. ANBUREY.

Saugor, Bundlekhund, May 23d, 1837.

III.—*Sugar-cane (from Singapore)*

Received with the following letter from Dr. MONTGOMERIE, accompanied by the opinion of Dr. WALLICH, and reported by Mr. MASTER, on its condition.

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

DEAR SIR,

Captain BOWMAN, of the *Gaillardon*, having kindly offered to take charge of some sugar-canes which I wished to send to you, for the purpose of ascertaining their value, and whether you consider them of a sort worth cultivating for the purpose of making sugar, I have sent a small case, containing cuttings of the cane, (in case you should think them worthy of a trial in Bengal,) packed in dry sea sand which has been well washed with fresh water. I also send six entire canes, viz. four of the same sort in the case, which by the Malays is called Těboo lěēah, which signifies tough or flexible cane; it appears to me to resemble the description given of the Otaheite cane—is this the case? The other two canes are of a different variety, and called by the natives Těboo kahor, from the white mealy incrustation upon the joints; the word kapor, signifying lime or chalk. There is a third sort of cane cultivated on this island which grows to a large size when ripe, and is of a deep purple colour, but it is, I believe, not valued in the West Indies for making sugar, although I understand that in Java it is cultivated for that purpose, particularly in new lands.

The *Tough-cane* which I send, had been planted eight months, and is rather better than a medium specimen of the field from which it was cut. The stole contained thirteen canes, weighing 55lbs. The field was, during the first two months, several times dressed with liquid manure, made from putrid fish, and applied about the roots of the cane. The weather at first was favourable for the growth of the cane, which grew luxuriantly; but I observed a good many split at some of the joints: perhaps from too much

moisture, but for the last three months we have had most unseasonably dry weather, which may have injured the growth of the cane. I observe the upper joints are much shorter than the lower ones, but this may be partly owing to the fugitive quality of the manure used.

The chalky cane is about $6\frac{1}{2}$ months old ; it does not appear to me so apt to split as the other. But the natives say it is more apt to be injured by dry weather at the season of planting.

I shall feel kindly obliged if you will favour me with your opinion of the cane, and hope you will excuse the liberty a perfect stranger has taken, and whose only apology is, knowing that you take a great interest in the agriculture of the East. If the cane is valuable for seed, it will afford me much pleasure to send you any quantity you may require. At the same time I should feel obliged by your sending me cuttings of the true Otaheite cane, if the cane I send is of an inferior quality.

Does the juice of a split cane become acid, and injure the formation of sugar, as is said to be the case when a cane is gnawed by rats. Again apologizing for the liberty I have taken,

I remain, yours truly,

(Signed) W. MONTGOMERIE.

Singapore, April 17th, 1837.

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR BELL,

According to my promise of yesterday, I have now the pleasure to send you our report on the condition of the canes from Dr. MONTGOMERIE, whose letter I return enclosed with best thanks. The canes arrived in very fine condition; some of the sets in the box packed in washed coarse sand, had sprouted finely (the uppermost layer or two).

Yours truly,

(Signed) N. WALLICH.

The canes look like the South Sea or Bourbon cane, and probably they are one and the same sort.

Botanic Garden, May 25th, 1837.

Botanic Garden, May 25th, 1837.

Examined the sugar-canes presented to the Agricultural and Horticultural Society by Dr. MONTGOMERIE, of Singapore, (see his letter of the 17th April last,) 30 sets of the "tough cane" packed in sea-sand in a box, all in fine condition, 4 whole canes of the same, looking well.

Two canes of a different kind, colour greenish, with whitish joints, apparently of large growth.

Planted the sets which had broke, in a bed, and put the rest in a paper.

J. W. MASTERS.

We shall have a valuable stock from this supply, if otherwise the two kinds prove good.—N. W.

IV.—*Sugar Mill.*

Remarks on the Sugar Mill in use to the West of Sirhind, by
M. P. EDGEWORTH, Esq.

[Read 10th May, 1837.]

TO JOHN BELL, Esq.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

As I suppose that any information, however trifling, will not be unacceptable to you, I have the pleasure to send you a description of the sugar mill used in this part of the country.

It is termed Kulhári in distinction to the Kolú in common use in the neighbourhood of Ambala, and in the Dooab. The use of it commences on this side of Sirhind, and extends through all that part of the country west of Sirhind to the Sutlej, where the sugar-cane is cultivated, and throughout the Jalindar Dooab.

Here, and indeed wherever I have noticed the use of the Kulhári, the cane is irrigated from wells, which in those places where, when the Kolú is used, it is not irrigated, unless from streams of water led through the fields from rivers.

A few plants of the Otaheite cane have been planted this season, which Lieut. Baker was so good as to send from his garden at Dadupore, and they are as yet thriving very well. A considerable quantity likewise of the Georgian cotton has been distributed among the Zemindars to be sown now. Some of it also has sprouted. It must always be sown earlier than the common cotton in this part of the country, on account of the early setting in of the cold weather, which nips the plant before the pods have time to ripen, if sown at the usual time, the commencement of the rains. I hope that I shall be able to give you a good account of both the cane and the cotton at the end of the season. I think they are both more likely to succeed here than about Ambala, as the Zemindars are not in the habit of irrigating either cotton or cane, which they constantly do here.

Yours sincerely,

M. P. EDGEWORTH.

Description of the Kulkári or Sugar Mill used to the West of Sirhind.

This Mill consists of two rollers (*belni*), the upper one of which is turned by a system of upright and horizontal wheels moved by bullocks exactly in the same manner as the Persian wheel, the lower roller is free to revolve on its own axis; between these rollers the cane is squeezed, the expressed juice falls into a hollowed piece of wood or bowl (*pári*) whence it is conducted by a spout (*nisár*) into a large earthen pot (*báha*); when the pot is filled another is substituted, and the juice is poured into the iron boiler or *karáha*, after which the process is similar to that in other parts of the country.

The wood usually employed is that of the *kikar* or *bábúl*, and that wood is preferred for the *pári* and *nisár*, unless *sirris* wood can be procured, but that is not abundant in the neighbourhood. For the rollers and the teeth of the wheels the wood of the *Phaláhi* (*Acacia dumosa*) or of the Chamoor (*Ehritia loevis*) or the *karíl* (*Capparis aphylla*) when it grows to a sufficient size are

preferred on account of their extreme hardness, but as the kîkar is the commonest tree in this part of the country, it is generally used for the whole.

The following are the terms applied to the different parts of the mill, beside those before mentioned.

The long pole to which the bullocks are yoked, ... Gadai.
 The horizontal wheel, Sargasht.
 The teeth of ditto, 20 in number, ... Dhinge.
 The upright wheel, ... Chakli.
 The teeth of ditto, 37 in number, ... Buria.
 The pivot, ... Thakula.
 The upright in which the pivot plays, ... Mohalan.

M. P. EDGEWORTH.

V.—*Hemp, the produce of Tavoy. Communicated by Captain*
 H. MACFARQUHAR.

[Read 10th May, 1837.]

TO JOHN BELL, Esq.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I have the pleasure to send you a specimen of Hemp grown in my garden here; it is, I believe, known by the name of the *Urtica tenacissima*, a few shoots of which were sent to me last year by my friend Col. BURNEY, from Ava.

It is cultivated by the Shans, the Siamese and the Chinese, the two latter with whom I have spoken on the subject are loud in its praise for its fineness of texture and durability, both as cloth and cordage.

I shall feel obliged if you will be kind enough to submit this specimen for trial to any person in Calcutta capable of giving an opinion as to its qualities, and the probability of its becoming an article of sufficient demand to induce the cultivation of it on this coast.

I remain, my dear Sir,

Yours truly,

Tavoy, 10th March, 1837.

H. MACFARQUHAR.

The nature of the foregoing Hemp explained by Capt. HANNAY.

[Read 14th June, 1837.]

TO J. BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I perceive by the papers of this morning, that Capt. MACFARQUHAR has presented to the Society a specimen of Hemp grown in his own garden, at Tavoy, the plant having been originally sent by Col. BURNEY, from Ava. This is, I believe, what is called the Shan hemp, and I beg to acquaint you that the same plant is quite common in Upper Assam, and is cultivated by the dooms or fishermen, for making their finest nets, for which purpose it is better adapted than any other Hemp that grows, both for strength and lightness.

Yours sincerely,

12th May, 1837.

S. F. HANNAY.

VI.—*Nonpareil Apple of Hydrabad. Communicated to the President, by Major MOORE.*

[Read 10th May, 1837.]

TO SIR EDWARD RYAN, *Knt.* §c. §c. §c.

MY DEAR SIR EDWARD,

Many thanks for your note, and for your having proposed me as a member of your Horticultural Society. I have this day sent under cover to you a specimen of the Nonpareil Apple, grown in my garden, and which we have taken from the same tree have been fully as good as any I ever tasted in England; unfortunately a severe hail storm we had a short time since, caused great destruction and somewhat bruised the fruit, so that I am almost fearful what I now send will not reach Calcutta in good order. I have addressed them to the Secretary under cover to you, and I would recommend their being opened directly they come to hand. I am very anxious they should ar-

rive in good order; I have enclosed in this box a short *memo.* regarding them. Some that I have taken from the tree measured $10\frac{1}{2}$ inches in circumference.

Very sincerely yours,

J. A. MOORE.

Residency, 25th April, 1837.

Three apples from Major Moore's garden at Hydrabad, of the Nonpareil species. The tree this year, without any care or even pruning, has borne 67 apples; many of them much larger than those sent, and having all the flavour of the apple in Europe. I received the tree from Madras about ten years since, and it was said to have been brought out from England. The tree that these apples came from is immediately within the influence of a nullah where the water runs for two or three hours every day. I am about to graft the common seedling apple of Hydrabad on this tree.

J. A. MOORE.

Residency Hydrabad, 25th April, 1837.

Note by the Secretary.—These apples were simply packed in cotton in a box, resembling that used in packing eau-de-cologne, and arrived in Calcutta in the most perfect state of preservation, and as juicy as if just pulled.—J. B.

VII.—*Orange Seeds of St. Jago and Cotton Seed from Fernando Po.*

The accompanying are Orange seeds from the Island of St. Jago, one of the Cape de Verde Islands. The Oranges were particularly fine, and reckoned to possess greater perfection than those of the Azores.

E. STIRLING.

10th May, 1837.

NOTE.—With the exception of a few seeds taken by Dr. WALLICH, for trial in the Botanical Garden, these seeds were all forwarded to Mr. INGLIS, at Silhet.—J. B.

No. 9. Cotton and Cotton Seed from Fernando Po, presented by E. STIRLING, Esq.

Note.—Dr. WALLICH took the seed to multiply in the Society's Nursery.

VIII.—*Cotton grown in the Society's Nursery Botanical Gardens, from seed received from America.*

[Presented at the Meeting of the 10th May, 1837.]

Upland Georgia Cotton.

Seed sown in the Society's Garden, October 4th, 1836, came up on the 8th October, gathered in May, 1837.

J. W. MASTERS.

New Orlean's Cotton.

Seed sown in the Society's Garden, October 4th, 1836, came up on the 8th October, gathered in May, 1837.

J. W. MASTERS.

IX.—*Creole Rice and Assam Sugar. Remarks by Capt. JENKINS, and notes "on accelerating the growth of seeds by scalding." Communicated by Dr. WALLICH.*

[Read 10th May, 1837.]

TO JOHN BELL, Esq.

Secretary to the Agricultural and Horticultural Society.

MY DEAR BELL,

The enclosed note was contained in a banghy parcel this afternoon received from Capt. JENKINS, together with the accompanying sample of Creole Rice from your supply, and a sample of Mr. Grange's Sugar.

I hasten to send all three to you, in order that you may kindly present them to the Meeting to-morrow. I shall be truly happy if both samples are found favourable. I have not opened them.

I cannot deny myself the pleasure to enclose an extract from Loudon's valuable Gardener's Magazine for December last, concerning the advantage of boiling seeds—literally boiling them before sowing! If the facts related were not so very respectably attested, they might be looked upon as fabulous almost. But Professor HENSLOW's testimony is beyond all doubt trustworthy.

Another curious fact noticed in the said periodical is the following:—A human skeleton was found in a tumulus near Maiden Castle, together with a portion of the contents of the stomach. The latter were found to consist in part of small seeds, which neither the gastric juices, nor probably the lapse of 20 centuries had sufficed to destroy. Professor LINDLEY has succeeded in producing plants from several of those seeds, which proved to be the *common Raspberry*. I have no time to have the above copied at length from the Gardener's Magazine.

Yours truly,

N. WALLICH.

Botanic Garden, 9th May, 1837.

TO N. WALLICH, ESQ.

MY DEAR WALLICH,

Mr. BELL wished to see some of the produce from the Creole rice he sent up here. I accordingly send a little which I shall be obliged by your sending to him. I shall be able to sow this year about 25 seers; last season was very unfavourable for want of rain, or I should have had a much larger stock—one or two natives who have tasted the rice, call it "Mota" and "Della." I send also a specimen of Grange's Sugar, as he is now manufacturing it—this is merely drained; there has been nothing used to clarify it whatever. I think the Kanyahs here have offered him 12 Rs. a maund for it. What would be its value in Calcutta?

Nothing new here; the river is just making an immense rise, by which I hope I may infer that there has been a fall of water above—for we have had a terrible dry season here, and are threatened with a total failure of the —? crop. Just now, 9 A. M. the thermometer is at 74° with a delightful N. E. wind, almost too fresh to be pleasant. We had one afternoon last week a gale from

the west, which must have come direct from the plague countries ; it raised the thermometer to 91°, the highest I have seen it at in Assam at any time ; it brought immediate sickness to the natives, but the last few days have been very pleasant again, with our old accustomed breezes. You have been, I believe, pretty warmish in Calcutta.

Yours sincerely,

April 26th, 1837.

F. JENKINS.

Extract from Loudon's Gardener's Magazine, for December, 1836, page 684.

Accelerating the Growth of seeds by scalding.—Cobbett, in treating of the locust, says, that he was recommended by an American gentleman (Judge Mitchell of Long Island) to boil the seeds previously to sowing them. (See Arb. Brit. p. 624,) and the idea is not so ridiculous as might at first sight be imagined. The subject was noticed by Professor HENSLOW, at the meeting of the British Association at Bristol ; and the following is an extract from a communication by the Professor to the Magazine of Natural History, vol. ix. p. 477.

“Sir JOHN HERSCHELL lately sent some seeds of an *Acacia* from the Cape of Good Hope, to Capt. SMITH, of Bedford, with directions that they should be scalded in order to secure their germination. Capt. SMITH having presented me with a dozen of these, I subjected them to the following experiments:—Two were placed in boiling water, and left to soak for an hour, until the water had become cool ; two were kept at the boiling temperature for 1½ minute ; two for three minutes, two for six minutes, and one for 15 minutes. Some of these were sown immediately under a hand-glass, in the open border ; and the rest were kept for three or four days, and then sown in a hot bed. The following are the results obtained :—

Under the hand glass.

- | | | | |
|----|--|---------|------------------------------|
| 1, | boiled for 1½ | minute, | failed. |
| 1 | „ | 3 | minutes, came up in 14 days. |
| 1 | „ | 6 | „ „ „ „ 13 days. |
| 1, | not steeped at all, did not germinate. | | |

In the hot bed.

1,	boiled for	1½	minute,	came up in	8 days.
1	,,	3	minutes,	,,	7 days.
1	,,	6	,,	,,	7 days.
1	,,	15	,,	,,	13 days.
2,	in boiling water left to cool,			,,	9 days.
2,	not steeped,		,,	,,	21 days.

We cannot draw any decided inference from the single seed, which was boiled for 15 minutes, having been more retarded than the rest, as it might have been a bad specimen; but it seems very clear, that the heat to which these seeds were exposed, must have acted as a decided stimulus to their germination; whilst it is a very singular fact, that they should not have been completely destroyed by it. Had I supposed it probable that a seed, which was boiled for 15 minutes, would have germinated, I should have boiled some of the others still longer, in order to ascertain the extreme limit to which such severe treatment might be carried without destroying the vital principle.”
—*Cambridge, July 8th, 1836.*

In pursuance of this subject, at the Bristol meeting, “Mr. HOPE mentioned a practice, common in some parts of Spain, of baking corn to a certain extent, by exposing it to a temperature of 150°, or upwards, for the purpose of destroying an insect by which it was liable to be attacked. Dr. RICHARDSON mentioned, that the seeds sold in China for the European market, were previously boiled, for the purpose of destroying their vitality, as the jealousy of that people made them anxious to prevent their exportation in a state fitted for germination. Upon sowing these seeds, he had, nevertheless, observed some few of them were still capable of vegetating.”—(*Edin. New Phil. Journ.* vol. xxi. p. 333. Oct. 1836.)

X.—*On the improvement of Cattle in India, by Mr. A. C. HULSE, Veterinary Surgeon.*

[Read 14th June, 1837.]

To J. BELL, Esq.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

When reading the *Bengal Chronicle* a few days ago, my attention was directed to an account of a meeting of the members of the Horticultural and Agricultural Society, of which you are the Secretary, and I noticed that a motion had been previously made by WM. STORM, Esq. relative to the practicability of improving the Cattle and Sheep of India by importing foreign stock. As the report on this motion was ordered to be laid upon the table for the considerations and suggestions of Members, I fear that the Rules of the Institution (my not being a member) may prevent any remarks or suggestions I have to make from being received. I shall, nevertheless, venture to give some little information I possess, relative to the breeding, &c. from imported sheep in India, and which being given with the view of instruction and benefit, will, I hope, be considered as an apology for the trespass.

I believe it was a short period only, that elapsed after the arrival of Lord WM. BENTINCK in this country, that he determined upon importing Spanish or Merino Sheep, being of opinion, that the climate and temperature would not prove uncongenial to this description of live stock. On the arrival of the Sheep, they were sent up to the Dhoon, to the care of Lieut. Col. YOUNG, who, I believe, received orders from Government to be particularly careful with, and give the best attention to his charge, Lord WM. BENTINCK being most anxious that his own wishes and opinion should be realized.

From enquiries I have made, and from frequent conversation with individuals connected with Col. YOUNG, I am of opinion, that he used every endeavour to promote the increase and breed

of Merino Sheep in the Dhoon, but his efforts were unavailing. The first rainy season, as also the following cold season, proved highly injurious to them, and they declined in health, and decreased in number so fast, that they were ordered down to Hauper, and there placed under the care and management of Mr. HODGSON, at that time, the Veterinary Surgeon to the Hauper Stud. Eventually they were presented to Mr. HODGSON by Lord WM. BENTINCK himself, with a request, that he would communicate, half-yearly, to the Military Board, the results emanating from his plans and management.

His half-yearly Report, was to embrace all particulars connected with Feeding, Breeding, the Wool, &c. &c. Mr. HODGSON was successful for a short time. During the hot weather he housed them shortly after the sun rose; in the cold weather, he bedded them with an abundance of fresh dry grass, daily. He fed them with gram, Doob grass, boosah, &c. The expence was enormous. When, however, the poor man was placed in arrest, he neglected to attend to his sheep, leaving the care of them, in a great measure, to a shepherd, who becoming careless, allowed them to fall off in every particular.

Early in May, 1834, Mr. HODGSON was ordered to Meerut to attend his Court Martial; at which place he remained two months; the shepherd during this period had sole charge of the flock, and during which time a great many of the sheep died.

It was at this period, that I was sent to officiate at Hauper, and having, on my arrival, noticed a large flock of sheep, to the number of 150, I enquired to whom they belonged, and finding, that nearly two-thirds were of the Spanish breed, I determined upon frequently looking at them, as they daily, morning and evening, passed my house to and from the grazing lands. I was sorry to perceive most of the sheep looking thin, and was informed by the shepherd, that every thing was going wrong, for the sheep were, many of them, sick, and deaths amongst them were almost daily taking place, no good reason for which could be given by the shepherd, but it was fully apparent to me, on further enquiry, that it was all owing to the great change that

had taken place in Mr. HODGSON's circumstances; instead of being fed upon gram, Doob grass, boosah, &c. as formerly, instead of being kept in their house and from the heat of the sun, they now had to find their own feed upon grass lands, and remain out in the sun throughout the day.

When Mr. HODGSON returned from Meerut, in July, he found, that nearly the half of his Merino flock, had died during his absence, and the remainder in very low condition. He made an effort to restore them, but his finances at this time were so low, he was unable to purchase sufficient food for their sustenance; he, however, by this half-fed measure, prevented their decreasing very fast, in point of number, and on his leaving Hauper at the end of the year, I purchased his flock of sheep, amongst which were thirty-seven Merinos, old and young.

On my obtaining possession of these sheep, I took care of them, and fed them as on their arrival at Hauper, but several, from the poverty of their condition, did not rally, and they died from exhaustion. When I rejoined my corps at Muttra, I brought these sheep with me, and being determined to succeed (if it was possible so to do in this climate,) I entertained an extra shepherd, that no care and attention to the Merinos should be wanting.

Without further particularizing, I am sorry to say, that at the expiration of two years (although every attention was paid by myself to the sheep, and although nothing was wanting, or expence spared for their comfort), I found myself in possession of the original number.

I, however, killed 2 weathers for my own table, and sold 8 at Agra, so that taking this into account, I have had an additional number! but when it is considered, that I had nearly 30 breeding ewes, and have 20 at the present time, it will be perceived that the increase at the expiration of the time stated above should have been more than double the original number.

My experience has caused me to form an opinion by no means favourable to the importation of foreign sheep. I am fully convinced, it cannot answer the purposes intended, and for the following reasons:—

1st. There is the greatest difficulty, and it is almost next to an impossibility to get a trust-worthy shepherd, and (unlike the shepherds of old), they are excessively stupid and ignorant.

2nd. The sheep must always remain housed, for if the shepherd is allowed to take them out to graze he will, to a certainty, allow them to mix with other sheep, and the breed will be ruined.

3rd. The expence is very great in keeping them always housed, and the price realized when fat, will not admit of it.

4th. The lambs do not grow to the size of the imported sheep.

5th. The wool of the progeny, bred in this country, becomes coarser, and is consequently of less value. It is also essential, that the wool should be long in order to make the best price of it; the sheep should therefore be shorn annually, but it is found, in the upper provinces, that sheep will not fatten with heavy long fleeces, and therefore it is necessary to shear them twice during the year, viz. about the beginning of March and middle of September; a thick fleece also retards their growth.

6th. They degenerate not only in size (as spoken of,) but in appearance; instead of the black spots upon the face, and frequently upon the legs instead of the buck legs, and brown or tan colour of them, many of the young have thick coarse legs, covered with short coarse wool; in fact, in every way they lose the same appearance as was possessed by the imported sheep.

7th. The sun and rain, extreme heat and cold, will kill them.

8th. The size of the mutton is not larger than what is commonly met with in Calcutta, nor would it be so large if proper attention was given to the feeding of Behar or Meywar sheep for the Calcutta market.

Although the above observations relate to Merino sheep, I think they might with propriety be applied to foreign sheep, generally, if imported to this climate. The broad tailed sheep, brought from Cabul, &c. a few of which sometimes reach as far as Agra, are generally purchased as pets or curiosities, but they cannot endure the climate; it is seldom they live to the end of the second year after they arrive in Hindoosthan.

In January, 1836, I sent a quantity of the wool of my Merino

sheep to England, but up to the present moment, I have not heard what it realized. If the Society determine upon speculating in sheep, and wish to try to improve the breed of the sheep of this country, I would recommend their getting a quantity of large Meywar sheep; the meat is somewhat coarse, but they are by far the largest description, I believe, that are to be met with in India. This breed might be crossed with Spanish or English, and by proper care the flesh would be altered in quality. If, however, I might be permitted to give an opinion, I would say, that the breed of horned cattle might, with much greater facility be improved, and if attention was given to this subject, it would tend to the benefit of the country generally. We find, that the common bazar cows, only give from 3 to 4 seers of milk daily, whereas an English cow will give four times that quantity at least. We have at the present time in Hattras two cows of English breed, that give from 14 to 16 quarts of milk daily. These cows are always housed and well fed. We hear, read and know of cows in England, particularly the Durham breed, that yield from 8 to 10 gallons per day, for months after calving, but these are cows of a particular breed, and are fed in a peculiar way. If a dairy was established by the Society for the supply of butter, cream, milk, &c. to Calcutta, I make no doubt, with able management, it would turn out, not only advantageous to the inhabitants, but a profitable speculation to the Horticultural and Agricultural Society.

I am not certain, that by the word "Cattle," Mr. STORM meant to include Horses, and I fear to write on this subject; I will therefore only say, that a good breeding establishment is much required in this country. It was asserted in the tent of the Commander-in-Chief (when passing through Muttra) by one of the senior officers on the staff of His Excellency, that the actual cost of horses, selected and passed this year for the purposes of the service, from the Ghazeepore stud, did not cost the Government (251) two hundred and fifty-one rupees each; if such be the case, (and I feel certain I am correct) knowing as we do, that much expence might be saved in a smaller establishment, it perhaps might be worth while for the Society (if

possessed of a sufficiency of funds) to take the subject of a breeding establishment into consideration.

Having carried my letter to a considerable length, and knowing little of the views which the members of the Society may entertain regarding the subject of which my letter treats, I shall conclude by offering my services, and opinions to the Society, at any, and at all times, upon any subject connected with cattle, sheep, &c. &c.

I have touched but slightly upon horned cattle, and less upon horses; but in the event of the Society bending their mind to the subject, I shall be happy in attempting to elucidate, by propounding my views most fully, for the consideration of the Society.

I am, Sir,

Yours faithfully,

A. C. HULSE.

Muttra, 12th May, 1837.

Same subject continued.

To J. BELL, Esq.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

In my last letter, which I took an opportunity of addressing to you a few days ago, I endeavoured to point out the opinion I entertained upon the subject of breeding sheep in this climate, SOLELY from imported stock.

Perceiving by the Calcutta newspapers, that at a meeting of the Members of the Agricultural and Horticultural Society, on the 10th instant, the subject of a *General Breeding Establishment* for Horses, Cattle and Sheep was in some measure discussed; I shall consider myself at liberty, (previous to receiving your reply to my last communication) to express my sentiments, upon breeding of sheep, after which, if agreeable, I shall resume my pen to treat of long horned Cattle and Horses, &c.

The management of a flock, and the rearing and breeding sheep, is at present so well understood in England, that I shall

not attempt any prefatory remarks,—as to breeding sheep of immense size, and improving the different breeds of the sheep of *Bengal* and *Hindoosthan*, I make no doubt it could be done with ease. I have no hesitation in saying, there would be no difficulty whatever in it. I doubt not the possibility of producing mutton equal in size to the Leicestershire or Southdown, from sheep of this country, crossed with English, I mean crossed with Leicestershire rams. To effect this, a selection of the finest Ewes in the upper Provinces should be made. Rams imported from England, and the system to be adopted and pursued, should be that of the well known sheep breeder. — Bakewell, Esq. who well deserved the celebrity he obtained, from the peculiar manner of rearing and feeding his flock, having originated with himself. His system is now followed by all breeders of fine large stock.

The finest and largest sheep in India, are the true Meywar, many of which are annually sent in droves to different parts of upper India for sale, and consequently, the same species of sheep are frequently denominated Dehli, Hansi, and I have heard them described as Futtighur sheep. But although they are the same class of sheep, and are exceedingly handsome, I am inclined to think, that the breeders do not bring to market, their largest and best sheep, because in the neighbourhood of Jeypore, from whence these droves emanate, they are commonly to be seen grazing on the naked lands, much larger in size. Now, although this description, or a similar jat, are to be met with all the way from Bhurtpore to Neemuch, I am inclined to give some preference to the sheep between Bhurtpore and Jeypore, because their legs are shorter, their backs broader, and their chests wider than those between Jeypore and Neemuch, and as there are now English butchers in Calcutta, who, no doubt, are able to give good prices for fat sheep, and as it appears to me, that the Society would derive more benefit to breed for the butcher, rather than the wool merchant, I should say, these sheep, as described and commonly called Jeypore sheep, with expanded chests, broad quarters and short legs, are the kind of sheep to experimentalize upon; because they will not only become larger and

very much heavier, but they will get fat in half the time that long-legged, flat-sided sheep will; not only so, but sheep with a round barrel and expanded broad chest, will breed regularly, and give the finest produce; in fact, it is the capaciousness of the chest and the other points described, that sheep breeders at home, at the present day, are so particular regarding.

To effect a full supply of this particular kind of sheep, any individual with full and perfect knowledge of the peculiarities above named, would be able, in fifteen days, in the country around Jeypore, to purchase any number of sheep, that might be required by the Society; and as these sheep travel well, they would, if bought at a proper season, be able to walk to Calcutta with ease and without any loss. The wool differs a good deal as to length and quality in these sheep; some is of good fair quality. Nevertheless, I again assert my opinion, that it will be far more profitable to attend to the size of the mutton than the quality of the wool. The latter can be an after consideration should it be found requisite, when the breed is advanced to its height in other respects. Perhaps it may not be amiss in this place to state, that a young sheep answering the description of "Futtyghur Jat," having been only nine months on gram, was placed alive by me upon the steel yard only yesterday, for the purpose of ascertaining its weight, which shewing 120 pounds avoirdupois, perfectly astonished me and others who witnessed it. This sheep is not large in comparison to the *real* Meywar, neither has half the usual time been allowed it for fattening on gram and boosah, and it consequently cannot be considered fat or ready for the table.

Respecting English rams, I would recommend the Leicester-shire; the largest and most noted Ram breeders, when I left England, were — STONE, Esq. of Knighton, near Leicester, and — WHITE, Esq. of Coates near Loughborough. These persons breed rams of immense size for sale, as also for the purpose of letting out on hire for the season, and they have netted large fortunes by their enterprise. If rams of the kind above named, were put to Jeypore or other large white ewes of this country, and every attention paid them, I have no doubt the Society would find their hopes and expectations realized to the full.

Perhaps some members of the Society may express surprise at my giving the preference to Leicestershire rams. I do so, because many of the largest breeders in the South of England, are in the habit of getting their rams, annually, from Leicestershire, which fact alone is a proof of their superiority.

I need not inform you, or the members of the Society, who are at present taking so deep an interest in the subject of an endeavour to improve the breed of cattle and sheep in India, that my views, as to the eligibility of founding a breeding establishment for horses, long-horned cattle and sheep, &c. are grounded upon the resources which the Agricultural Society not only possess, but which they can command in various points and ways. It is not to be supposed that sheep in the Society's establishment will have to depend upon gram and boosah, as is the case with small establishments where mutton and lamb are fed merely for the purpose of a mess or private family. It is a fact, proved in numberless instances, that the ox and sheep will thrive better, and get fat much quicker upon frequent change of food. I therefore look to the immense benefit that would accrue, in the connexion that would exist between the Agricultural and Breeding Society. The knowledge of this connexion is a sufficient guarantee, that many things, and indeed every thing required in the way of succulents and esculents would be provided, and which would have a most beneficial effect upon cattle and sheep, without saying anything of the economy of the measure. As this however is more connected with feeding than breeding, and as it is not unlikely, I may, at a future opportunity address you upon the subject of feeding cattle, &c. you will excuse my saying more on this head.

Should the Society determine upon trying the imported rams as recommended, and have no knowledge of any individual through whom they could procure them, I shall be happy in furnishing you with the name, &c. of a gentleman, in whose selection and good judgment the Society might place full confidence; and in any other particular, upon the subject of which my letter treats, I beg you to command my services.

I am,

Yours faithfully,

Muttra, May 29th, 1837.

A. C. HULSE.

XI.—Rice.

Extract of a letter from Captain P. G. CAUTLEY, Superintendent of the Doab Canal, to the Secretary, dated 10th June, 1837.

[Read 14th June, 1837.]

TO J. BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

“I take this opportunity of saying a few words on our progress in matters relating to Agriculture. My attention has been for the last four or five years directed to the improvement of the quality of rice and to the introduction of superior varieties, on the line of the Doab Canal. This species of cultivation, as well as that of sugar, is new at a great many places, and has only been introduced since the canal supply of water admitted of regular irrigation. The quality of common rice grown in the upper northern portion of the Doab, is of a coarse description, with the grain short and thick, and although the produce from a given portion of land is considerable, it is held in much less esteem even by the cultivators themselves than the seed of a fine quality; although inclined to imagine that the deterioration of the grain is the natural consequence of the change of soil and climate, and that I have no chance of making the success general, there is still a probability of meeting, on such an extended line, with patches of land favourable to the growth of our improved grain, and even should this not be the case, it becomes an experiment to prove whether or not, it is worth the while of the farmer or cultivator, to import new seed annually or biennially as necessary for the maintenance of the superior stock. The plan upon which I have acted is, to distribute fresh grain annually, in small portions to all the rice villages in the Canal, requiring from the cultivator a return of seed equal to that given to him. The quantity distributed annually is about 15 maunds. I have, for the last three years, procured it direct from a spot north of Nahun. in the Raja's territories, famous for the variety called Bansmutti, the grain of which is exceedingly

long and delicate. Seed was formerly procured from Pilibheet; the grain which I received from that place was inferior to the Bansmuttee of Nahun. Specimens of each crop, or rather from each Zemindar to whom grain is in the first instance given, is forwarded to my office after the grain is cut, and by this means I have a very tolerable idea of the state of deterioration, which does not appear, as far as I have as yet seen, so conspicuously exhibited in the *form* or size of the grains as in the odour, which in the fresh seed from Nahun is slightly aromatic and fragrant. I did myself the honour of sending the specimens of one year to the Horticultural Society of Meerut, and I regret that their opinion was not communicated. Without professing to be sanguine in the success of the experiment, I have hopes that the trouble will not be entirely thrown away, and if my present system is persisted in for four or five years, the point may perhaps be decided.

“With regard to cotton, I have not been successful, nor is the country on this side of the Jumna so favourable as that to the westward. The seeds which have been distributed, seem to have been allowed to fall off, and the Zemindars from the ill success of their first experiment have not been inclined to practice it further. The want of fresh seed, however, is the true cause of the experiment not being prosecuted, and my own plantations near Seharunpore have been decidedly far inferior to those of Col. COLVIN, at Dadoopore. I am now sowing the seed of last year on a new patch of ground, and shall be able to see the effects of more careful superintendence with the advantages of manure, &c.

“As the Doab is notoriously a sugar country, and as celebrated for that as the land westward of the Jumna is for cotton, there is greater probability of success in the Otaheite cane. The Zemindars at once enter into the cultivation feelingly, seeing no doubt of success, and this may be considered a point much in its favour. From seven canes planted in my garden last year, I got upwards of 500, half of which has been planted out near Juhanpore, and the other half has been sent to the village of Doola in the Meerut district, in a fine sugar country; both the fields are working well, and the young plants thriving, and if the proportion of sow-

ing and reaping of last year, may be depended upon in this year's produce, I shall be able next season to distribute largely amongst the cultivators. The Zemindars are exceedingly anxious to obtain supplies of this cane; but their method of planting is so opposed to improvement in growth, and their ideas with regard to quantity and quality so completely wrapped up in an opposite system of planting to that which is so obviously advantageous, that there will be some difficulty in persuading them, that the method of close planting is opposed to both quantity and quality, and unless room is given for the proper vegetation and growth of this magnificent cane, and if the Zemindars persist in placing the cuttings touching each other or nearly so, as they are in the habit of doing now, a deterioration must inevitably follow. This is one of the greatest difficulties that we shall have to contend with, and will probably never be perfectly conquered, until the establishment of European planters and, the success arising from their operations open the eyes of the natives.

"I shall be happy at all times to forward the interests of the Society as far as my situation enables me, and beg leave to subscribe myself."

"P. S. The accompanying is a specimen of Indigo grown last year at Kulsea, 12 miles north of Seharunpore in the Doab Canal; it was manufactured by an inexperienced person, and the crop was an inferior one."

NOTE.—The sample of Indigo referred to, was considered by the Meeting of fair quality.—J. B.

XII.—*Caoutchouc.*

Experiments on various Trees in Assam, with a view to ascertain the properties of their juices in connexion with the article "Caoutchouc." By J. W. HELFER, M. D.

[Read 12th July, 1837.]

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,

Considering the daily increasing importance of Caoutchouc as an article of exportation and commerce, I have been lately occupied in examining those plants, which produce this peculiar substance, and which are indigenous in Amherst province on the Tenasserim coast. I am most happy to communicate to you the subsequent results, accompanied by specimens obtained from the milky juice which emanates from incisions made in the bark.

Neither *Jatropha elastica*, nor *Urceola elastica* occur in a wild state in the province. *Ficus elastica* is to be found in the high mountains forming the northern boundary, but I could not get it at this time on account of the rains. My examinations were therefore limited to vegetable productions hitherto not yet analyzed in this respect, except the Jack tree (*Artocarpus integrifolia*), which has been known to produce a substance, identical in its properties, though not in appearance, with common Caoutchouc.

No. 1. is a specimen of it, and I may be allowed to add the subsequent observations. The milky juice emanating in moderate quantity from every part of the tree, but most copiously from the immature fruits, has till now not been transformed by me in a perfectly solid state. Pouring the milky juice fresh from the tree in earthen moulds as is done in America, did not answer the purpose; the moulds exposed to a slow fire, instead of drying the substance, render it more fluid, and so it continued for weeks.

No. 2. is C.* from the Jack tree obtained in the following way. The milky juice brought in a flat basin, is mixed with an equal quantity of water, and then agitated during two hours with sticks, by which a good deal of carbonic acid is removed. In about an hour, the C. substance begins to separate from the water and extractive matter and coagulates; in one hour more the separation is perfectly effected, the C. gets a milk white appearance and a tolerable consistency, but it does not dry perfectly. Perhaps, if a longer time exposed, this desirable quality may be obtained.

No. 3. is likewise C. from the Jack tree obtained by a different process. The juice, after having been agitated about one hour as above mentioned, I added to the fluid acetic acid, which had the property of separating the thinner parts of the juice at once by coagulating it. I put it then on a moderate fire in a tin vessel, till the aqueous parts were evaporated and obtained the C. substance more elastic, but perfect dryness remained a desideratum.

Having the milky juices of other C. yielding plants at my disposal, I expected that a combination of *Artocarpus*, with a rather too solid C. would produce a consistent mixture; but in this I was deceived. The natural properties of these two substances were too heterogenous, and they combined only mechanically, the Jack enclosing the harder substance of the first Number. Vide No. 4.

No. 5. is C. from a creeper named *Talring*—No. (The plant being not in flower at this season, and so too the subsequent, I am not able to determine the botanical genus). Making incisions, a great quantity of juice issues resembling rich milk, which exposed for days to the atmospheric influence, remains unaltered. I obtained a separation in a double way, either by adding alum to the fluid and agitating the mass for one hour, or by boiling it after the addition of alum. In the first case, very soon a matter resembling cheese separates, and squeezed together produces a substance like that of No. 5. In the second case a very elastic lump may be collected when boiling the fluid, which in

the beginning indeed is as elastic as the best known C. but exposed to the air it becomes hard, and loses soon all elasticity. No. 6. is a specimen of it.

It is known, that almost all fig trees yield a substance in its properties highly resembling C. Of this numerous genus, I tried till now only the peul tree (*Ficus religiosa*), and found the production very different according to its locality. The peul tree, growing on elevated ground, yields a very coarse substance, indurates at the first instance and seems to be without value. No. 7. is a specimen of it. The peul tree, on the contrary, growing close to the water, gives a reddish fluid, which remains unaltered for several days. Treated with acids it does not coagulate, and differs therefore from No. 5; treated with alkalis it remains unaltered, it evolves very little carbonic acid and is the best reduced to a solid state by boiling; it never possesses much elasticity and hardens soon when cold.

No. 8. is a specimen of it. The observations about the pipul tree give us a hint, that very much depends upon locality, and probably upon the season in which the fluid is collected, and I suppose that superior qualities of all C. will be obtained either before or shortly after the monsoon. But even if these now enumerated species should not yield elastic C. I think they would not for this be valueless; their chief application in Europe is for thin coatings impermeable to the air, and it has been ascertained that less elastic C. if solved in naphtha, sulphuric ether, and obtains a high degree of elasticity. I suppose likewise that an addition of turpentine or linseed oil will diminish its hardness and perhaps re-establish its elasticity.

No. 9. is a very superior C. obtained from another creeper called Kiep paung; it issues as a milky juice which does not coagulate by itself. I treated it like the other kinds with acetic or diluted sulphuric acid, and exposed it to the heat in a tin vessel. When boiling, it coagulated, and the separated parts at first assuming every shape, were exposed to the air. Its influence did not diminish the elasticity, and changed only its colour; being in the beginning snow white, it assumed very soon a copper red colour, and became afterwards brown.

No. 10. is likewise a very good C. coming from a tree called in Burmese Kyo-ta-ra. It is entirely a natural production. The sap issuing, coagulates the moment it comes in contact with the atmospheric air, and may be gathered in pieces like that of the accompanying specimen.

I examined several other milky juices from plants belonging to the family of Asclepiadaceæ and Euphorbiaceæ, almost all reckoned by the natives to be strong poisons, but none gave a commendable C.

Collecting all the vegetable juices, the existence was ascertained of a tree yielding gamboge. No. 11, is a specimen of it. I think it is a production of a tree different from *Gambogia gutta* L. and it would be perhaps interesting to have its medical virtues examined, to know how far they agree with those of the Indian *Caracapully*.

I have the honour to remain,

Sir,

Your most obedient servant,

J. W. HELFER, M. D.

N. B.—The samples referred to in this communication, have been submitted to the Caoutchouc Committee, whose opinion or report, will be published when sent in.—J. B.

Professor O'Shaughnessy's Opinion of some samples sent to Dr. WALLICH, by Capt. JENKINS, of Assam.

[Read 12th July, 1837.]

MY DEAR WALLICH,

I have much pleasure in acquainting you, for the information of the Agricultural Society, and of your friend Captain JENKINS, that the experiments I have instituted on the Assam Caoutchouc and Petroleum, have been attended with the most favourable results.

The Caoutchouc you last supplied me, is of far better quality than any of the Indian article I have yet examined, and is more easily dissolved in naphtha, ether, or camphor oil, than the ordinary Caoutchouc sold in Europe.

By far the best of these solvents is the naphtha, distilled from such Petroleum as Captain JENKINS sent me. His Petroleum yields nearly two-thirds its weight of transparent colourless naphtha, which again will dissolve about half its weight of Caoutchouc. The distillation of the Petroleum and solution of the Caoutchouc can be performed in earthen vessels.

It is easy also to procure from this Caoutchouc two-thirds of its weight of an oil (called Caoutchoucine,) in which the Caoutchouc itself may be dissolved. But wherever Petroleum is cheap, it will be more economical to use that fluid.

I have prepared with great facility, water-proof cloth and paper of different kinds, simply by brushing over a surface of the fabric with a solution of the Caoutchouc, and then applying a similarly prepared piece, pressing them together, and allowing them to dry.

I am quite certain, that a lucrative trade might be speedily founded in Assam, by teaching the natives how to prepare articles, such as water-proof petarabs, small tents, &c. &c. The process is so simple, that it can be learned at a single lesson.

Yours sincerely,

W. B. O'SHAUGHNESSY.

July 10th, 1837.

XIII.—*Observations on the Uses and Properties of the Roosa Grass Oil.* By J. P. MARCUS, Esq.

[Read 14th June, 1837.]

TO J. BELL, Esq.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

DEAR SIR,

I have the pleasure of despatching to you this day by dawk bangy, two bottles of the *Roosa Grass* seed, which may not be unworthy of notice to the Society, and to the medical men and apothecaries in Calcutta; a small portion of land in the gardens

of the latter being sown with this grass would, in the second year, be fit to distil from it a quantity of that valuable and fragrant oil so much sought for in the cure of all chronic pains and rheumatisms, and is esteemed a more efficacious Rubefacient, than all the embrocations made with kyaputtee, turpentine, or camphor, but that which is brought down from Nemauro is adulterated with other oils, and never to be had pure, and yet it sells from 14 to 15 Rupees per seer. How much better would the apothecaries in Calcutta distil it in their own dispensary from the grass raised or cultivated in their gardens to obtain it genuine for medical use; and should you require more, or others who may wish to have this seed, I shall be happy to supply them. The season for sowing is early in June, and a cutting would be obtained for distilling the oil in October. The reader is referred for the process of making it to the third volume of the Transactions of the Medical and Physical Society of Calcutta, or the Grass Oil of Nemauro, by J. FORSYTH, Esq. I also send a small phialful of the oil distilled by me for the inspection of the Society. The package not admitting room to send a larger quantity.

I remain,
Dear Sir,
Yours very faithfully,
J. P. MARCUS.

Naunsaugur, 29th May, 1837.

XIV.—*Method of Drawing Water from Wells in the vicinity of
Hydrabad.*

*Extract of a letter from Capt. T. LYSAGHT, to H. WALTERS,
Esq. dated May 16th, 1837.*

[Read 14th June, 1837.]

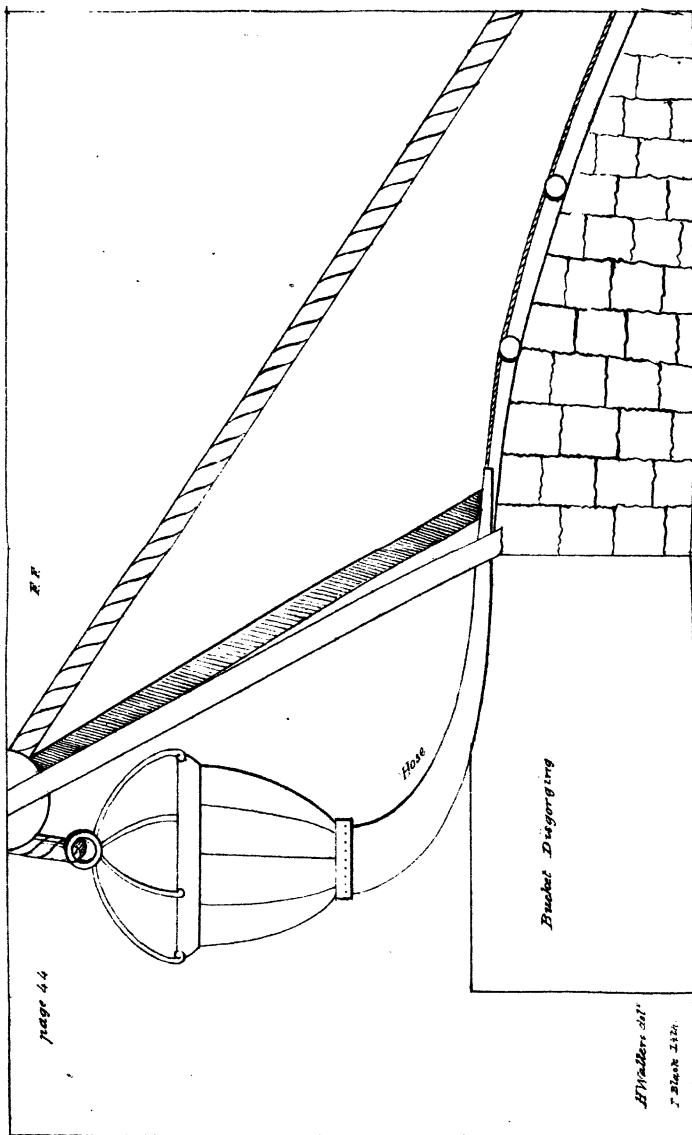
“ Now I will give you a bit of information which, if known at our side, is never acted upon that I have seen. It is the me-

thod of drawing water from wells in practice here, which, instead of two men, as *our* plan, requires but one, to drive the bullocks. Instead of the leather *mote* which we use, they here have an octagon (why this shape I know not,) iron bucket something of this shape (see enclosure) with a pale of 6 or 8 inches diameter at bottom, to which is fastened, through holes at the bottom of the bucket, a leather hose about six feet long, to the end of which is fastened a small *messenger*, which is again made fast to the yoke, and is of such a length as to keep the end of the hose higher than the upper rim of the bucket when ascending. The bucket is raised as ours is, excepting that the pulley hangs more over the well. The messenger plays over a small roller at the edge where the bucket empties itself, and when the bucket is drawn a couple of feet above this, the messenger pulls the end of the hose with it, and the moment the water loses its level, it of course rushes out, and the bucket again descends as usual. They here make the bullocks *back* up the slope to lower the bucket, a bad and slow plan I think. I hope you will understand this, and the plan, which being *well* done, I have given you the benefit of, as you may see in the corner; it is an object to gain the services of one man, and as it does not appear to be generally known at our side I send it to you."

XV.—*On the Destruction of Orange Trees by a large maggot.*
By Lieut. BIGGE, of Assam.

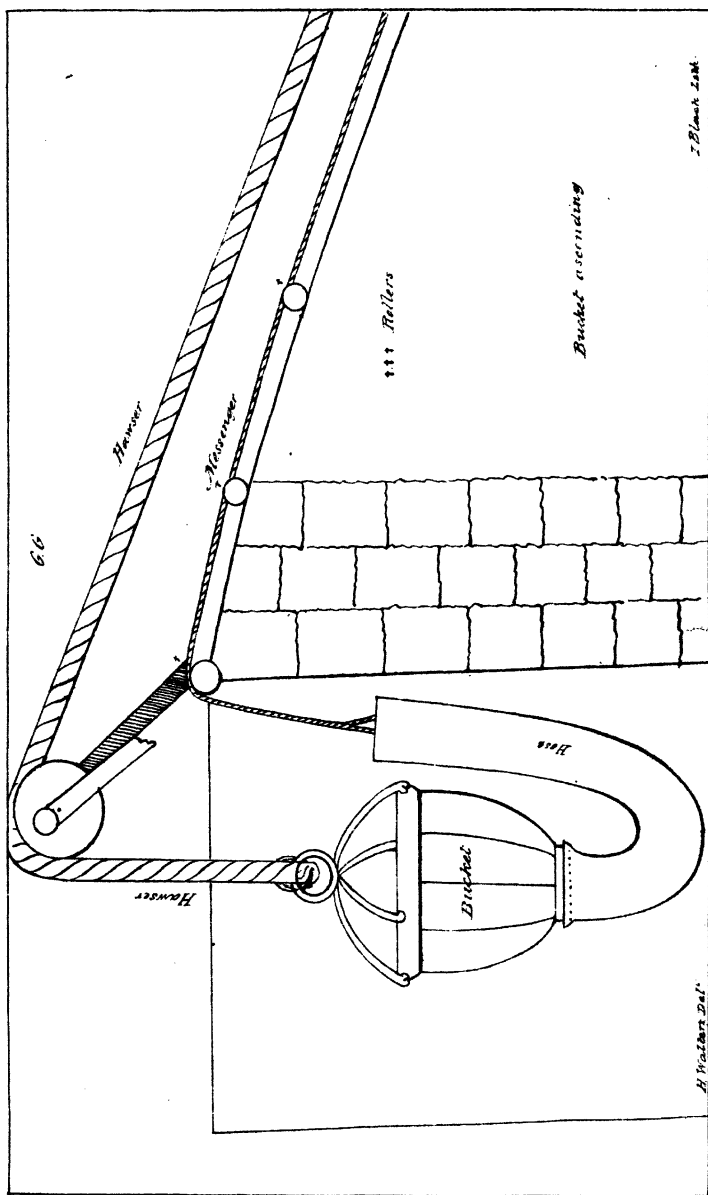
[Read 14th June, 1837.]

In June, 1836, on my return to Vishnauth from China, I was a good deal annoyed at finding a great many orange and lime trees, which I had brought from some distance, and planted in front of my bungalow, had disappeared, and the remainder shewed evident signs of decay.



page 44

W. H. Waller del.
J. B. Baker sculp.



On making enquiry as to the cause of this, I was informed by Lieut. B. who had occupied my house during part of my absence, that they had been killed by an insect, which I understood to be a fly, or some species of wasp, which I have frequently observed boring holes in posts, chokuts of doors, &c. and which might be easily destroyed by the usual application of tar, lime, &c.

But further experience, and the total failure of several trials, soon convinced me, I had a far more dangerous enemy to contend with, and the constant but almost invisible decay of the few remaining trees, determined me to cut one down and try to discover the cause. I accordingly cut down No. 1, about an inch above the ground, and found it perforated in two places, the holes evidently penetrating below the surface of the earth, and also having a hole some way up the trunk of the tree. I split this tree in two, to show the nature of the working of the grub (of which two specimens are forwarded with this,) and then laid bare the roots of No. 2, to the extent of five inches below the surface, in order, as this tree showed no marks on its trunk of being injured, to see whether the grub commenced its operations from below or not. The result proves, the almost total impossibility of defending trees from such insidious attacks, as the root is penetrated in five different places, so as to render it almost incapable of supporting the stem, let alone to furnish a sufficiency of sap, for the production of leaves, fruit, &c.

No. 3. is a portion of a tree which, without any sign of decay, further than the projection of the portion of the stem, excavated, and sticking out, (which is the usual appearance of the effects of the operations of this grub,) was blown down during a very slight breeze of wind, about the same time. Since then I have lost every tree of this sort, about 40, and all in the same way, though it does not appear that they attack any other sort of trees, as there were guavas, peach, coffee, liquot trees, all intermixed with these, every one of which escaped. A great many other trees, in different position at the station, also suffered in the same way; some having fruit almost ripe, and some before the fruit was formed; in short, neither soil, situation, or

any precaution, seem to have any effect in keeping off this pest, and I, therefore, bring it to the notice of the Society for the purpose of endeavouring to elicit some information which will enable us to resist its effect, and of which we are as yet ignorant.

XVI.—*On the Introduction of Hops into India.*

Extract of a letter from a Practical Farmer in England, to Sir HENRY FANE. Communicated in a letter to the President of this Society.

[Read 12th July, 1837.]

“In the present instance I am not able to comply with your wishes, because the hop season was over before your letter arrived, consequently no seed could be procured. In order to collect it in a state to vegetate, some poles should be set apart for the fruit to mature, and then it must be extracted from hop pod, and immediately put into bottles, excluding all air from it, and forwarding it as early as possible before the humidity and the vegetating properties of the seed are all dried out. This I will attend to next year particularly, and in the mean time I have adopted a mode which, if successful, will put you further forward by some years than you will be by raising plants from seeds, which will occupy at least five years to bring into a state to produce fruit. The box sent herewith* contains some cuttings of last year; as soon as you unpack them, put them into the ground in rows about one inch apart; if they vegetate, leave them in the ground until they mature; you must then cut them down, and if they are sufficiently strong to afford thick bine, you may cut that into lengths of about six inches, and plant them in a nursery ground, observing the directions which I

* This box has arrived since these communications were read. Vide Sir HENRY FANE's letter to the Secretary.

send herewith, or you may at once commence your plantation with the cuttings ; at all events you must begin with the plants which I send. Provided they strike the first season, in the rows, I think the climate of upper India will suit them ; the only doubt in my mind about them, is, whether there is a sufficient duration of cold weather for the plant to regain its strength before it is brought again into action, and whether for want of this invigorating change, the plant may not exhaust itself. I send this, as well as the box with the plants, by the *General Kyd*, which is the first ship that has touched at Portsmouth since I received your letter, and I sincerely hope that I may have adopted such a mode for the preservation of the plants as may insure the receipt of some of them in a proper state. I understand that some have been sent to Archdeacon Broughton, at Sidney, in a similar way."

Observations on the Culture of Hops.

The first subject for the consideration of the planter is, that of soil, whether he may possess any of a quality sufficiently rich to favour the growth of this plant ; for the cultivation of it being expensive, unless the produce should make a suitable return, a certain loss must be created. The most genial soil is probably a loam or marl of a depth of at least three feet, and if the substratum is of a porous nature, it will be more favourable for the growth of the plant, for the following reasons: That the root will run with greater facility, and that the moisture will more speedily escape, for while it is retained in the soil, it chills the root of the plant, and checks its growth ; on this account a clay soil is too tenacious in its natural state, but when improved by a copious dressing of free chalk, which not only opens the pores, but chastens it, the plant will grow in it freely, and in my own experience I have known to succeed so well, that the plant would take a sixteen foot pole with more ease than the twelve foot pole, which it had been previously supplied with.

The next thing to which the planter's attention should be directed is situation, as strong winds are injurious, particularly those from north to east. It is highly desirable to have the plantation

as much sheltered from that quarter as possible, so as to escape the early ray of the morning sun coming on the plant before the dew has evaporated, as insects will be produced by the warmth of the sun. The plantation should be sheltered as much as possible from all winds, as the fruit becomes even discoloured when shaken much by the wind, and although intrinsically it is not injured (the virtue and strength being in the Farina,) but the sample is not so good to appearance. I now come to the culture which is practised in England. The process in the first place commences by preparing the ground, by trenching it from two to three feet deep according to the soil. When this is done, the ground is set out in squares of six feet, leaving a stick for a mark at every square, to mark the place for planting which is done either with nursery plants, or with cuttings which are the superfluous parts of the roots taken off in the spring, and trimmed to the length of four inches, when cuttings are used, five are usually put into a hole, made with a large dibble, the lower points being placed together, and the soil over the top pressed hard round with the hand. When nursery plants are used, three will be found sufficient; some planters use one way and some another, but I always gave the preference to cuttings, for if they succeed, a year's growth is gained by it. The first operation for the year is digging, which commence when the weather becomes dry in February; the implement used for the purpose is a prong and not a spade. If favoured by weather, a man will dig an acre in eight days upon the average. The next process is that of laying out the poles; which is taking them from the stack and placing the heel of the pole close to the hill to be in readiness to set up. Two poles is the accustomed number to a hill, but where the hill is very strong a third is sometimes used. Next comes the opening and cutting, that is, clearing away the old hill that was collected round the plant the preceding year, with a hoe, and cutting from the stock all that part which grew from it the former year; (it is from this the cuttings are collected) and after thus clearing, a little earth should be drawn round it again to prevent the bleeding. The polling next follows, which is done when the bind begins to shoot, by making a hole with a crow bar, and then forcing

the pole into the hole. When the bind is sufficiently strong to select that which appears to be the best, it is brought to the pole, viz. three to each pole, and twisted round the pole *with* the sun, and lightly tied with rush or Russia matting. After the first tying, they should be constantly watched and fresh tied, for if they are neglected they will slip down the pole, and when they are above the reach, a back ladder is used as soon as sufficient binds have been selected for the poles, the remainder are torn off, and with a hoe some earth is drawn round the hill to stop the bleeding, which would much weaken the plant. Hilling comes next in succession; this is done with a shovel, by throwing a heap of earth round the plant in a conical form to the height of about 18 inches from the level of the ground to the top. The plant being now set in order for growing, nothing further is to be done until it arrives at maturity, but to keep the ground clean, as the various operations will have trodden the earth, it should be loosened again, which is done with an instrument made for that purpose with the hoe at one end, and a prong at the other, and is used like a pick-axe. When the ground is turned up with this instrument, it should be knocked about to break all the clods, and render it smooth again; when weeds appear, it should be kept hoed: but when the hop is in fruit, the hoe should not go deep into the ground, or it will disturb the fibre which runs on the surface and nourishes the fruit. Next comes the picking, which is done by drawing the pole, (after cutting the bine about a foot from the ground), and laying the pole across a basket, into which the fruit* is dropped. As fast as they are picked, they are taken to the kiln to be dried; where they are spread on a hair cloth, with a charcoal fire underneath. Some kilns have French holes made like an inverted funnel, and some English. I prefer the French: the hair cloth should be at least eight feet from the fire. The frame should be lathed and plaistered. Next comes the bagging, which is done by men getting into the bag and treading them hard, having a half hundred weight with which they bump as they walk round. The hops should be

* Flower.

turned once or twice in the store room, to cool them thoroughly before they are bagged. Next follows the sale, and last of all the collection of the money.

Not being aware of any book in print giving an account of the mode of cultivating the hop, I have given it you as well as my weak head will admit of.

(Signed) JOHN OMMANNEY.

January 14th, 1837.

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,

I have to acknowledge the receipt of your letter of the 7th instant.

I am gratified that any proceeding of mine should have been deemed worthy of the notice of the Agricultural Society.

I am very sorry to say that I apprehend that my promising prospects respecting the cutting of the hop plants, will have been revived in Calcutta. When the box of cuttings arrived, Messrs. COCKERELL and Co. instead of forwarding the box, wrote to me for orders how to dispose of it. I immediately directed that it should be forwarded forthwith, by steam to Allahabad, and with expedition from thence.

On receiving this order, they proposed to send it by the steamer of the 11th instant; but Captain JOHNSTON having reported that he had not room for any box of more than one foot square, this unlucky box has been returned to Messrs. COCKERELL's godowns; in which I calculate that it will, unnecessarily, have spent about two months. This, I fear, will deprive the cuttings of any vitality which might have remained in them at the end of their voyage from England: and further, I am apprehensive that they will now not arrive at Simla, until after I shall have departed therefrom. It is highly provoking, after their successful arrival at Calcutta.

My ground has long been prepared for them, and I think

in a very advantageous situation ; but the circumstances I have detailed, have marred all my hopes of success.

I am, Sir,

Yours faithfully,

H. FANE.

Simla, August 22d, 1837.

XVII.—*Cotton grown at Cuttack from American seed. By*
Major SYERS.

[Read 9th August, 1837.]

TO J. BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I have this day forwarded to your address, through Messrs. LIVINGSTON, SYERS and Co. samples of Virginia, Persian and Cabul Tobacco, grown in the branch Society's garden at this place; likewise a small quantity of *Peruvian** Cotton grown from seed obtained towards the close of last year. I am in hopes, now that more attention will be paid to the culture, that our next produce will be infinitely superior. The cotton plants are in an extremely healthy state, and I trust will afford a large quantity of seed for distribution in the district. Allow me to solicit the favour of your letting me have your opinion of the quality of the samples on their arrival in Calcutta, and with many thanks for the seeds you have kindly dispatched through WATSON and Co.

I remain,

My dear Sir,

Yours very faithfully,

JOHN D. SYERS.

Cuttack, June 22d, 1837.

* *Pernambuco.* See Major SYERS's letter of 17th July, to the Secretary.

XVIII.—Cotton grown at Bareilly from Bourbon and Brown Nankin seeds. By Major C. C. SMYTH.

[Read 9th August, 1837.]

TO JOHN BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

Having been admitted a member of the Society about eighteen months ago, I take the liberty of forwarding two specimens of cotton raised in my garden last season. I am no judge myself, but I am told they both appear to be of a superior quality. The brown Nankin cotton is rather a curiosity I believe.

I am, Sir,

Yours faithfully,

CHAS. CARMICHAEL SMYTH,
Major, Comg. 4th Local Horse.

Bareilly, 10th July, 1837.

XIX—Cotton grown at Shahabad from Egyptian seed. By G. LEYBURN, Esq.

[Read 9th August, 1837.]

TO J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

MY DEAR SIR,

I have the pleasure to send you for the inspection of the Agricultural and Horticultural Society, a sample of the produce of the small packet of Egyptian Cotton seed sent me in May last year.

The seed was sown at the commencement of the rains last year in July, in a good loamy soil, flowered partially in October, and gave some small produce in December and January. In March it flowered and gave produce till the end of May; the plants were most luxuriant, and from four to six feet in height. Since the commencement of the rains, the plants are again throwing out very strong shoots. The produce from about 200 plants was upwards of nine factory seers, the contents of the bag forwarded you, and about seventeen seers of cleaned seed, two seers of which I have forwarded. One important feature in the produce compared to the cotton grown near here is, that the Egyptian yields half cotton and the other seed, the country cotton has three parts seed, and only one of cotton, set aside the superior staple of the former. Some of the plants I had transplanted to give room to the others which should be nearly two feet apart; they thrived though they were very dwarfish compared to the others and gave scarcely any produce. The dry season has, however, very much lessened the produce and growth. It is a cultivation difficult for a European to carry on as even with this small cultivation it required constant watching to prevent theft.

Yours faithfully,
GEORGE LEYBURN.

Nunnore, Shahabad, 7th July, 1837.

XX.—*Cotton grown at Kishnaghur. By F. HARRIS, Esq.*

[Read 9th August, 1837.]

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

DEAR SIR,

I have much pleasure in sending you some Egyptian Cotton, produced from the seed I received from you about this time last year.

27th July, 1837.

Yours truly,
F. HARRIS.

XXI.—*Report of the Committee on Samples of Cotton referred to the preceding communications.*

TO MESSRS. A. COLVIN, JOSEPH WILLIS, W. SPEIR, and
DR. HUFFNAGLE, *Members of the Cotton Committee.*

GENTLEMEN,

The following samples of Cotton, presented at the last General Meeting of the Agricultural and Horticultural Society, are submitted for your opinion.

I am,

Gentlemen,

Your obedient Servant,

JOHN BELL,

Sec. Agr. and Hor. Society.

August 16th, 1837.

No. 1.—Cotton, the produce of Egyptian seed, grown at Nunnore, Shahabad, by GEO. LEYBURN, Esq.

2.—Cotton, the produce of Egyptian seed, grown at Kishnaghur, by F. HARRIS, Esq.

3.—Cotton, the produce of Pernambuco seed, grown at Cuttack, by Major J. D. SYERS.

4.—Brown Nankin Cotton, grown at Bareilly, by Major C. C. SMYTH.

5.—White Bourbon Cotton, grown at ditto by ditto.

I should have preferred expressing an opinion, *after* some of the more experienced members of this Committee, as their remarks would have been a guide for me. I am sorry that the specimens do not resemble the produce of my own country more closely.

No. 1.—I think the staple good and cotton soft; the time for examination is, however, too short to enable me to judge by a comparison.

2.—Inferior; harsh and short staple.

3.—This specimen is clean and soft, and I like it the best.

Nos. 4 & 5.—Staple short, removed from the seed with difficulty. CHARLES HUFFNAGLE.

No. 3.—Is the best looking sample certainly, but on comparing length and strength of fibre, I do not think it equal in these respects to 1 and 2. These latter appear to have been carelessly gathered and defective accordingly in colour. No. 2 looks as if it had been bound.

4.—Is soft, short, silky, but very weak.

5.—Short woolly staple, something like the Moulmein.

I do not possess the knowledge of these different sorts as brought to market in England, to form any comparative judgment of the specimen. A. C.

No. 1. *Shahabad, Egyptian Seed Cotton.*

Much stained in colour by too much moisture at the time of ripening, too soft, fleecy, and weak in staple, and will work too much waste by the spinner.

No. 2 *Kishnaghur Egyptian Seed Cotton.*

Rather stained and inferior in colour, the staple superior to that of No. 1. in strength, but inferior to that of the best Egyptian cotton grown in Egypt.

No. 3. *Called Cuttack Pernambuco Seed Cotton.*

Came with so little of the character of Pernambuco cotton, that I should have doubted whether it had been grown from that description of seed, unless it had been so stated; its colour is very good, but its fibre is remarkably short, fine and weak.

No. 4. *Bareilly Brown Nankin Cotton in seed, grown in the year 1836.*

The seeds are well fledged, or covered with cotton. The cotton is remarkably fine but short in staple, and is now weak probably from the effects of age and exposure since the time of its growth; it adheres tenaciously to its seed, as is usual with this description.

No. 5. *Bareilly Bourbon Seed Cotton in seed, grown in the year 1836.*

The seeds appear middlingly fledged or covered with cotton; the staple is fine; rather short, and now weak, and may, like No. 4, have suffered from age and exposure since the time of its being gathered.

JOSEPH WILLIS.

XXII.—*Assam Silk.*

Report from A. AIKIN, Esq. Secretary to the Society of Arts on certain samples of raw and manufactured Silks, the produce of Assam, sent to the Agricultural and Horticultural Society by Capt. JENKINS, and forwarded by Dr. WALLICH, to the Secretary to the Society of Arts in London with a letter, dated 17th July, 1837.

[Read 9th August, 1837.]

TO N. WALLICH, ESQ.

MY DEAR SIR,

Although your letter respecting samples of silk from Assam, &c. was received by me in January, 1836, yet the samples themselves did not arrive till May, just as our Session was on the point of closing. The consideration of the subject was therefore necessarily deferred till the beginning of the present Session.

Capt. JENKINS's notices are so brief and imperfect, that we should have been much at a loss respecting them, unless I had fortunately recollected, that in the Linnæan Transactions, is a paper of Dr. ROXBOROUGH on this very subject, and which, as you do not at all allude to it in your letter, has perhaps escaped your observation. It is in vol. vii. p. 33.

The samples of the silk, both raw and manufactured, have been submitted to the examination of some of the principal dealers in silk in London, and the following is their opinion.

Nos. 1 and 2 are described as "common moonga, from the worm of the Moonga tree;" the latter being "wound off by experienced hands."

No. 1. is quite unknown in England. It is too coarse for ordinary use, but would be very saleable for sewing silk, for which article there is always a great demand, and the sample being more than usually clean for so full a size, there is no doubt that it would find a ready sale in the English market. It would, however, be absolutely necessary to have the silk reeled from the cocoons in large skeins. The value of such silk in December last would have been about — shillings per lb.

No. 2. is a good sample, and would also find a ready sale in this country. Its value in December would have been about — shillings per lb.

Qr. ? What is the Moonga tree, and are the above samples produced from the common silk-worm, or from some other species of *Phakena*?

No. 3. "Silk of the mulberry worm from Durrung." Is analogous in quality and size to many silks which are continually exported from Bengal, and are in constant demand. Similar silks were sold at the October sale at about — shillings per lb.

From each of the two cloths of Moonga silk a square was taken: these were boiled together, three several times, in a strong solution of common soap in river water. The water of the first boiling came off very thick and foul, that of the third boiling was but little changed. Both cloths were much improved in softness, colour and lustre. The opinion of the Committee is, that the cloth with a red end, and which sells in Assam for 2 Rs. 8as. per piece (if more care were taken in producing it cleaner, that is, more free from knots,) would be a good material for handkerchiefs, or to be worn round the neck. It resembles Indian tafeta, and would probably answer well for printing on.

The second sample called "good Moonga," and which sells at 6 Rs. per piece, would probably be found when printed, to be a capital article for shawls and dresses, being analogous to China crape, which has long had a regular sale in this country.

With regard to the three samples of raw silk above mentioned, the Committee have reported that, on account of their novelty, it is impossible to class them with accuracy, till they have

been put through the usual manufacturing processes, for which at least one cwt. of each would be required.

The Area thread consists evidently of two varieties, one of a dirty white colour, the other of a yellowish brown; the latter having more lustre, and being considerably harsher than the former. The thread is composed of fine filaments, each of which has, individually, considerable lustre. But as these filaments have evidently been made into thread, not by winding from the cacoon, but by spinning by hand, in the manner of cotton, the lustre of the thread, and of that of cloth made from it, can scarcely be greater than that of *spun* silk, an article, for the reason above mentioned, exceedingly inferior in price to reeled silk. The Area thread is, besides, very uneven, and as ill made as possible, and very dirty, so that in its present state it would meet with no sale in the English market. By boiling with soap it becomes cleaner, and a good deal resembles badly spun silk. By soaking the cacoons in alkaline lie, as described by Dr. ROXBURGH, in his paper already referred to, I see no reason why, with proper care, it may not be reeled off like other silk, in which case its European value would be greatly increased; and as the worm seems so hardy and so easily provided with food, it would be worth while to take some pains with its silk.

Of the two cloths made from Area silk, that which is of a loose soft texture, becomes still softer, and acquires more lustre by repeated boiling. The other cloth is of a very strong fabric and resembles nankin: it is improved in feel and colour by boiling with soap, but with the exception of the fringe, has gained hardly any perceptible degree of lustre. In price it could not compete with cotton cloth in the English market, and its great durability would be but a small inducement to the purchaser, and none at all to the manufacturer. Such is the incessant mutability of our fashions in articles of dress, both as to the pattern and mode of making them up, that you would not find one man in an hundred, or one woman in a million, who would dare the sneers of their acquaintance by wearing the same garment for three years.

The Area silk appears to be the same as that described by Dr. ROXBURGH under the name of Arrindy silk, produced by the *Phalœna Cynthia*, and which, in Bengal, he says, is cultivated in Dinagapore and Rungpore. Both insects feed on the *Palma-christi*, their caccoons are both white and yellow brown; the filament is so fine, that the natives do not attempt to reel it, but spin it like cotton. The cloth of both is exceedingly durable, descending from mother to daughter. The only difference that I can perceive is, that Mr. H. CREIGHTON says, the Arrindy cloth is rendered rotten by the action of boiling water, which certainly is not the case either with the Area thread, or the cloth made of it. Perhaps, as Mr. J. GLASS suggests in Dr. ROXBURGH's paper respecting the Arrindy silk, it might be worth while to send to England a sample of Area silk in its raw state, simply pulled from the caccoon, to see if the manufacturers of shawls could not make an advantageous use of it.

We shall be very glad to enter into a correspondence with the Agricultural and Horticultural Society of India on any subjects of mutual interest, and I address this letter to you as Secretary to that Society in order to make a beginning.

Herewith I send three copies of our last volume of Transactions, according to directions given me by the Society. One for the Agricultural and Horticultural Society of India, one for Mr. PRINSEP,* and the other for yourself.

I remain,

My dear Sir,

With sincere regard, yours very truly,

ARTHUR AIKIN,

Secretary.

Society of Arts, &c.

Adelphi, 27th Feb. 1837.

P. S. I have opened my letter by advice of the Chairman of the Committee to erase the prices of Nos. 1, 2 and 3 Silk, in consequence of the present disturbed state of the markets.—12th March:

* This packet was addressed, H. T. PRINSEP, Esq. to whom I accordingly forwarded it.

XXIII.—*On Cotton, Coffee, &c. in Beerbhoom.*

*Extract of a letter, dated 2nd August, 1837, from F. FURNELL,
Esq. Secretary to the Agricultural Society of that Station, to
J. BELL, Esq.*

[Read 9th August, 1837.]

MY DEAR SIR,

The branch garden is getting on very fairly ; it contains altogether about five begahs, and may be enlarged, if necessary. About a begah is planted with Georgia and Sea Island cotton which I brought up from the Society; about half the plants are healthy and promise well, but the season was so unfavourable, that it is impossible to have much or good produce. The remaining half is now looking healthy, but very low and small ; it may improve. The Coffee plants with which Dr. WALLICH supplied me, have been put down, and are looking extremely well. As I suppose shade is useful, I have had some plantain trees placed in rows with them ; about half a begah has been planted with the American boota, which is thriving admirably. Some melons have been produced, but though large and looking very fine, they are very watery and insipid. I fear they were sown rather late, and that the rain has interfered with the flavour. There is also a cottah or so under arrow-root, thriving ; and about the same quantity of Guinea grass ; these were got from Mr. DOVLY's garden. The joomla rice has been a failure. I distributed all the cotton seed, the joomla rice and the boota or Indian corn.

Yours faithfully,

F. FURNELL,

Sec. Agr. Soc.

XXIV.—*Report from the Secretary to the Moorshedabad Agricultural and Horticultural Society on the progress of their exertions to introduce new seeds, in a letter, dated 6th August, 1837, to the Secretary to the Society of India.*

[Read 9th August, 1837.]

DEAR SIR,

I am happy to inform you, that the several varieties of seed for which our Society is indebted to the liberality of the Agricultural and Horticultural Society of India, have, as far as they have been tried, proved excellent, with the exception of the *Canada maize*, which I am sorry to say has not vegetated. This is the more to be regretted, as seed of this very superior variety would have proved a most welcome gift to the agriculture of these parts, where the ordinary country kind is extensively raised as an article of food by the natives. We have been equally unfortunate with maize from Chirrapoonjee, a beautiful white grain. Should it, therefore, be in your power to grant us a further supply of any approved variety, we shall be happy to give it a further trial, ere the season pass by.

The Guinea grass seed has come up well ; better in the ground than in pots ; and better when exposed to the late copious showers, than when in any way protected from their influence. I mention this circumstance, because I am aware that many persons are apprehensive of the seed rotting by heavy rains ; but this does not appear to be the case. This grass was never before cultivated in the district ; and will, without doubt, prove a most valuable food for the cattle of the neighbouring populous towns and villages.

Yours very faithfully,

J. W. LAIDLAY,

Sec. Agr. and Hor. Society, Moorshedabad.

XXV.—*Specimens of the Productions of Nepaul, from Dr.*
A. CAMPBELL.

[Read 9th Aug. 1837.]

TO J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

MY DEAR SIR,

I have the pleasure to send you 34 specimens of the agricultural productions of the valley of Nepaul, of which the accompanying is a list, in the local appellations attached to them by the cultivators, as well as (in some instances) the English and Botanical synonyms.

Along with these specimens are two others of the field productions of the neighbouring plains of Sarun and Tirhoot.

Will you do me the favour to present this parcel of seeds to your Society, in the hope, that they may prove interesting to its members, as subjects of comparison with the productions of India or other countries.

With reference to the general objects of your Society, and to the recent formation of an Agricultural Committee of the Royal Asiatic Society of London, for the purpose of ascertaining among other things, how far the field and garden productions of Europe may be advantageously added to from those of India; I beg to suggest to the Society the propriety of transmitting some of the seeds now presented to that Committee, some of them, (as for instance, the mustard and other oil seeds,) for the purpose of ascertaining their relative value in commerce; others, the upland rice, Indian corn and capsicums, to be introduced in England, or other more suitable countries of Europe.

The *gohya*, or upland rice, as a variety of that grain, requiring but little irrigation for its growth, and coming from this country, the climate of which so much more resembles those of

Europe, than any of the Indian ones, is a fair subject of experiment.

The Indian corn, equalling to all appearance those specimens of the American maize you so kindly sent me, and (although originally most probably brought from the plains of India to these hills,) inured to this climate, may also be suitable for trials of comparison with that grain, either as it is (I believe) grown in Italy, or for introduction into the field produce of the poorer lands of England and Scotland.

The red pepper, however, of which three varieties are forwarded, would, I believe, be a very valuable acquisition in England, and from the readiness with which it grows throughout these hills, would most probably flourish in England. The Nepaul capsicum is celebrated for fine flavour throughout a great part of India, and is consequently exported in considerable quantities annually to the plains. All Europeans who have used the West Indian cayenne, and the East India also, are agreed as to the far superior flavour of the Nepaul chilly, to either of the others.

The phofur (buckwheat) of these mountains too may prove to be a better description of that grain, than is now grown in Piedmont and other parts of Europe.*

It will afford me much pleasure to forward large supplies of any of these articles, and in any quantity, if required by the Society.

Yours truly,

A. CAMPBELL.

Nepaul Residency, July 25th, 1837.

Samples of Agricultural produce from the Valley of Nepaul.

- No. 1. Gohya, or upland rice.
2. Malsi, a variety of transplanted rice.
3. Touli, ditto ditto ditto.
4. Wheat.
5. Indian corn.
6. Murwa.

* Royle's Himalayan Botany.

- No. 7. Phofur, (buckwheat.)
8. Luttia or Ramdana, (English name not known.)
9. Oorid, (black variety or species.)
10. Oorid, (purple ditto.)
11. Mossoor, (Ervum Lens.)
12. Moongh, (Phaseolus Mungo.)
13. Methi, (Trigonella feuum grecum.)
14. Koorti.
15. Goras, or Gorans.
16. Kerow.
17. Oorid, (large coarse variety.)
18. Bhutmas.
19. White field Pea.
20. Surshoo, (Sinapis alba, mustard seed.)
21. Tori, (black mustard seed.)
22. Til, (Sesamum Orientale, black variety.)
23. Silaam, (an oil seed.)
24. Barley.
25. Tisi, (Linum Usitatissimum.)
26. Bori, (Symplocos Spicatum.)
27. Chunsoor, (the green plant of this seed eaten as vegetable. Is the common cress.)
28. Sheto Sem, (white kidney bean.)
29. Kaila Til, (party coloured Sesamum.)
30. Sheto Til, (white Sesamum—the latter two kinds of Til, reckoned inferior to the black one (No. 22) which is the Sesamum Indicum.
31. Mooli, (large white field raddish.)
32. Chota Lal Mirich, (Capsicum minimum.)
33. Burrah ditto, ditto, (Red Capsicum.)
34. Peela Mirich, (Yellow Capsicum.)

*Specimens of Agricultural produce from Tirhoot, and Sarun
(coarse grains.)*

- No. 1. Janera, black variety, (Agrostis hirearis.)
2. Bajra, (Panicum spicatum.)
3. Cheena, (Panicum Miliaceum.)
4. Kowni, two specimens, (Italian corn, I believe.)

5. Kodu, (a species of *Panicum*.)
6. Samah, (ditto ditto, I believe.)
7. Puttooah, (a species of *Cannabis*.)
8. Janera, (white sort.) *Agrostis* sp.

A. CAMPBELL.

Nepaul Residency, July 25th, 1837.

XXVI.—*Cotton grown at Delhi, from American Seed, and the Otaheite Sugar-cane, introduced in the Dhoon. By G. H. SMITH, Esq.*

[Read 13th September, 1837.]

The Upland Georgia, New Orleans and Sea Island Cotton, sown in my garden at Delhi, is coming on remarkably well, the former being already in flowers, whereas from the Peruvian seed which was sown at the same time, I have not succeeded in raising a single plant.

Out of 20 Otaheite canes with which Col. COLVIN was obliging enough to supply me, about thirteen arrived in good order; the rest from want of care in the packing, had lost their vegetating power before they reached me. From these 13 canes, I have succeeded in raising the enormous number of between thirteen and fifteen hundred, some of which are reported to me as being already upwards of seven feet, whilst the whole average, more than five feet in height. The great difficulty we have to contend against in these provinces in raising this description of cane, is the injury done the cuttings, when first planted, by the white ants. There is a word very common in the Dhoon, which the natives call "Butch," through which it is said, if the water used for irrigating the cane is passed, it will effectually keep off these troublesome visitors. It will, of course, be tried, and its virtues tested during the ensuing season, if efficacious, I doubt not, but that in a few years Otaheite cane to a very large extent will be produced in this favoured valley.

XXVII. - *Otaheite Sugar-cane in the district of Azinghur.*

Extract of a letter from J. B. JONES, Esq. of Jounpore, to the Secretary, dated 11th August, 1837.

[Read 15th September, 1837.]

I rejoice to see that your zeal and energies have given solidity to the Society, and engaged a general attention to its interests. You will have the satisfaction of knowing a few years hence, that you have awakened some of the slumbering resources of India, which will enrich her people, and give importance to her worth.

I am sorry to say that the cuttings of the Otaheite cane which I received through the kindness of a friend in the western provinces, were devoured in the field by white ants immediately after they germinated. I believe this was the fate of two or three supplies in this district; therefore, I do not consider myself singularly unfortunate, but the loss of a season is no inconsiderable loss in the race for agricultural improvement. Dr. DUNLOP tells me that a great part of the cuttings have taken to the soil of Azinghurh, and two or three other gentlemen, both North and South of me, have been so fortunate as to establish a nursery for increasing the cultivation next season. The grand preliminary work, therefore, is done, and the prospect of substituting a productive and better, for a very inferior cane, made obviously certain. For my part, I am now deeply interested in the sugar trade, and intend to take the departments of growing my cane and making my sugar under my own management. I cannot, therefore, urge a better reason for asking for as large a supply of naturalized cuttings, as you can send me. Oblige me, therefore, by saying, how much I may expect. If you have seeds of any sort to give, I must sue as a humble candidate. Indigo prospects were good here till lately, when too much heat interposed; but still it is good—rain in a day or two will work wonders.

Yours sincerely,

J. B. JONES.

XXVIII.—*Upland Georgia Cotton and Tarturian Wheat, introduced in Deyrah Dhoon. By Lieut. KIRKE, in a letter to the Secretary, dated 29th August, 1837.*

[Read 13th September, 1837.]

Should you at any time get more of the Egyptian Cotton seed out, I hope you will kindly favour me with a good supply by the steam boat, a cooly from thence could easily bring me thirty seers. I would willingly pay for a cart load, could such a thing be, as I feel convinced it is the Cotton that will thrive best in the Dhoon, though nothing could be finer than some three acres of Upland Georgian that I have now growing in my compound, in poor stony soil, and only planted in June ; it is $2\frac{1}{2}$ feet high already, and I dare say will give a tolerable crop. I have some also planted in good soil as well as some on rich garden soil, and planted in different seasons of the year, from March to July, so that I hope to gain some experience in the cultivation of it by the end of the year. I take this opportunity of returning my best thanks for your truly valuable present, the Treatise on Sugar-cane, which reached me four days back, and from which I have already gained much valuable information. One thing I find from it, that I have got my Upland Georgian Cotton twice too thick ; however, as it was only meant for seed for next year, it may still answer. The hint on thrashing the cane must also prove very beneficial, and I intend trying the experiment after the rains, as I have an acre of common country cane, set in the manner described in a letter lately written to our esteemed friend Dr. WALLICH.

When setting the cane, all the Native Zemindars came to look at it, and all agreed then that I could have no crop at all. I am happy to say that they have now to a man changed their opinion, and all say that such a *Khate* was never known in the Dhoon before, and some have actually said that they will follow the example next year, and I have no doubt, they will do so if they see that my plan yields double the produce that theirs does.

Should you think my plant a good one, and might in any way prove useful to the public, pray do not hesitate in doing so: the only thing that I think wants correction, is setting the cane, perhaps, too thick, and continuing the irrigation too long, perhaps the 10th or 15th of October would be sufficient, so as to enable the cane to open by the 1st of January, and that thrashing out to commence about the 1st of October on the plan mentioned in your valuable book; the lines, too, ought to be due east and west, in this part of India, as the wind is always from the west. I am happy to say I have got a regular English plough-wright, to make me up a plough and harrows, and I hope next month to see them at work. I have, of course, reduced the size to two-thirds in width of share to give it a fair chance of succeeding, and am in hopes of getting an English ploughman to teach the Natives the use of it.

There is a creeper very common in the Dhoon, from which I think good Indian rubber might be made, but I am ignorant of the process; perhaps you could favour me with some instructions on the subject, and I will try the experiment; should it succeed, a hundred acres might be easily made, as it grows from slips and multiplies in an extraordinary degree. Have you ever tried the "Celestial Barley" or "Tartarian Wheat," as I find it grows uncommonly well in the Dhoon, and is very prolific? I have now several maunds of it, which I raised from a few seeds that were brought from Kenower; on counting the number of grains in each ear, I found that it was twice the number contained in an ear of wheat, amounting generally from 87 to 96. It makes delicious flour, and our Goorkah sepoy's say, that three-fourths of a seer of it fills their stomachs better than a seer of otta made from wheat. I sent some of the seed to Lord DALHOUSIE, two years back. I have since heard that it succeeds in England admirably. I intend trying what an acre will produce in weight, as I think it must be more profitable than wheat. Should you not have seen the grain, I shall have much pleasure in sending you some.

Believe me, my dear Sir,

Yours truly,

HENRY KIRKE.

XXIX.—*Vine and Apple Plants raised by Dr. HUFFNAGLE, from fruit imported in Ice.*

[Read 9th August, 1837.]

TO J. BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I wish to invite the attention of our members to the specimens I now offer for their inspection, viz. a Malaga Grape Vine, and a Pippin Apple Plant.

The seeds from which these have been produced were obtained with fruit lately imported in Ice from America. The only care required has been the occasional application of manure, and nearly all the seeds planted by me have vegetated. I send you a few for distribution; the vine has been so successfully cultivated in Persia, as far South at least as Lat. 25°, that I think with a *northerly* exposure, and a little care, we might succeed here. The Malaga Grape is considered one of the best varieties for the table, and a seedling will bear fruit between the 4th and 5th year, perhaps sooner in this climate. It flourishes best in a light and *dry* soil, and it will, therefore, be necessary to protect the root during the wet season from too much moisture.

Accompanying I have the pleasure to send you a *piece of cloth* manufactured from the *Upland Georgia Cotton* grown in my garden; you have now the *cloth, twist* and the *raw material*, shewing the result of my first crop, from American seed, planted in November, 1837.

I remain, yours truly,

Calcutta, July 20th, 1837.

CHARLES HUFFNAGLE.

NOTE. The vine plant was presented by Dr. HUFFNAGLE to Mr. STORM, and the apple plants to Mr. BELL, who transferred the gift to Mr. STORM.

XXX.—From Doctor MONTGOMERIE, of Singapore, presenting the model of a Rice Mill.

[Read 13th September, 1837.]

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

I request that you will do me the favour to present to the Agricultural and Horticultural Society, a Model of a Rice Mill which is in common use, at Malacca. The model is a little more than one-third of the diameter of those in use, and the relative proportions are tolerably correct, with the exception of the thickness of the teeth and intervening spaces which are of the full size. I beg to refer you to the description which you will find in the *Singapore Free Press*, of the 10th August; if it should be deemed desirable to procure any of the mills from this part of the world, I shall be happy to render you every assistance in my power. But I have no doubt, that on showing the model to some of the Chinese residents in Calcutta, you will be able to get them made up, as the implement is of common domestic manufacture among Chinese cultivators. In conjunction with the mill a set of funners is used similar to the instrument in common use in European farm yards, but the introduction of this would, perhaps, be too wide a stride in the march of improvement for a Bengalee for some time to come.

I was glad to see, that the cane I sent up by the *Gaillardon*, was thought favourably of, but if it is not the true Otaheite cane, you will confer a great favour upon me by sending me a few packed in straw in the way those I sent were.

I remain, your obedient servant,

W. MONTGOMERIE.

Singapore, 15th August, 1837.

XXXI. --*Sugar-canes sent from Singapore, by Dr. MONTGOMERIE.*

[Read 3rd October, 1837.]

MY DEAR SIR,

I received your kind favour of 25th July, and the *Water Witch* offering a quick, and therefore favourable opportunity, I send some canes, 5 bundles of 20 canes each, at your request, which from being full grown, I fear may not be so likely to grow as those formerly sent. I find that some of them have been attacked by the *borer*, or what I suppose to be such. Does this render such a cane quite useless for boiling into sugar? I have not been able to ascertain any thing satisfactory relative to the origin of the canes grown in this settlement: they form part of the *sea stock* of almost all native vessels, and as we have communication with all the *East*, by such means we may have got them either from Siam, Borneo, Celebes, Java, or any other neighbouring country. The natives recognize the red or purple cane as the Tuboo *Malacca* pointing out Malacca as the place of origin, but they *think* the three light coloured varieties, namely, Tuboo, *Liat* or *Leeat* Tuboo Tilor, and Tuboo kapur have been introduced by the Buggese trader from the eastern islands, and in such case they may most probably be a variety of the Otaheite cane modified by the way they may have been cultivated by the natives.

These canes have, in a good many instances, become top heavy, and bending down to the ground, struck out roots from the point touching the ground, and have been so crooked that I was under the necessity of cutting off the bent ends to enable me to make them into convenient bundles. What is the best method of preventing this laying down of the canes?

Yours sincerely,

Singapore, August 3rd, 1837.

W. MONTGOMERIE.

XXXII.—*Sugar-cane Cultivation in the district of Azimghur.*

Extract of a letter from R. MONTGOMERY, Esq. to the Secretary, under date 24th August, 1837, with a statement of the quantity of land under Sugar-cane cultivation, &c.

TO J. BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society
of India.*

SIR,

As this is one of the greatest Sugar districts in India, and as such, must become daily more interesting to the speculators in that line, I have the pleasure to forward a statement (lately compiled from the recent measurements for the settlement of the land revenue) of the quantity of land under sugar cultivation, to which I have added an estimate of the quantity of sugar manufactured in the year 1836; the average of 12 maunds of goor per beegah, which I have assumed, is, perhaps, too little, considering the productive quality of the soil, consequently the quantity of sugar produced in that year, estimated at 4,31,446 Ghazeepore maunds, in a district containing an area of 2,580 square miles, is, if any thing, rather under than above the mark. The quantity of land under sugar cultivation could, I think, be nearly doubled, were sufficient inducement held out to the cultivators. During the present year there has been exported to Calcutta from this district alone, nearly 200,000 maunds of sugar, independent of what has been sent to the Westward, the exact amount of which it is difficult to calculate with any certainty.

Azimghur, 24th August, 1837.

SUGAR-CANES AT AZIMGHUR.

1871-1872.

XXXIII.—*Caoutchouc.*

Samples made under the Superintendence of Lieut. VETCH, and forwarded by Capt. Jenkins through Dr. WALLICH.

[Read 13th September, 1837.]

MY DEAR WALLICH,

I send in a separate packet some India rubber which I hope you will approve of. It is manufactured under the superintendence of my good assistant Lieut. VETCH.—Will you kindly lay this before the Agricultural Society, and get your Caoutchouc Committee to give me an opinion on its quality, to set the thing agoing. Lieut. VETCH would, I dare say, get some of our Patjhersia (heads of villages) to collect a few maunds for the Society, should it think proper to patronize this product, and to send samples to England, giving the men a reasonable price to collect it. As the Society is rich, they could afford something more than the market price, as a sort of bonus, to stimulate the wild Cacharees. Please also say what would be a fair market price in Calcutta for Caoutchouc thus prepared.

Yours sincerely,
F. JENKINS.

Note by Dr. WALLICH.

The samples of India Rubber arrived yesterday afternoon in a wax cloth banghy parcel, which was soaked through and through. The samples were quite wet when I took them out, they are marked.

A.	}	Two of each kind.
B.		
C.		

I will write to Capt. JENKINS to ascertain the meaning of the above marks. There was no letter in the parcel.

N. W.

26th September, 1837.

XXXIV.—*Reports upon Caoutchouc.*

1st. *On samples produced by Dr. HELFER, and alluded to at page 38.*

2nd. *On samples produced by Lieut. VETCH, and referred to in Capt. JENKINS'S note to Dr. WALLICH, marked (A) dated September 12, 1837.*

DR. HELFER'S SPECIMENS.

No. 1. The milky juice of the *Jack Tree* (*artocarpus integrifolia*) obtained from several parts of the tree, but chiefly from the unripe fruit, partially concreted by exposing the earthen moulds to a slow fire.

No. 2 is from the same tree; equal quantities of juice and water are agitated in a flat basin, by which process, separation is effected in an hour, and in one hour more, the substance attains a tolerable degree of consistency, but does not dry effectually.

No. 3 is from the same tree, and after going through the same primary process as observed in No. 2, the Doctor adds acetic acid, which produces a more immediate separation, and by thus exposing the mass to a moderate fire, the aqueous parts are taken up, and coagulation follows with a certain degree of elasticity.

No. 4 is a heterogenous mass of pieces from other plants brought into contact with *Artocarpus*.

No. 5 is from a creeper called "*Talaing no.*" By exposure to the air for days, no alteration was visible. Dr. HELFER then agitated it with the addition of alum, and produced a substance resembling *cheese*, which on being squeezed, is No. 5.

No. 6 is the same as No 5, only the juice and the alum are boiled, which, during the process exhibits a fine elastic substance, but exposure to the air destroys this elasticity.

No. 7 is from the *pepul tree* (*ficus religiosus*) growing on *elevated ground*, produces a coarse *Caoutchouc*, and is regarded by Dr. HELFER as valueless.

No. 8 is from the same tree growing on low situations close to the water; the fluid remains unaltered by exposure for days; not treated with alkali, it remains stubborn, and only gives up a liquid for a solid state by boiling, and then hardens without elasticity.

No. 9 Dr. HELFER pronounces as being superior Caoutchouc, obtained from a creeper called "*vice fo-paunj*;" the juice does not coagulate without the aid of heat, and acetic acid. By this process elasticity was obtained, and exposure to the air did not affect this property, only changing its color from white to brown.

No. 10. is derived from a tree pronounced by the Burmese *kyo-ta-ra*. It is entirely a natural production, the juice coagulating instantaneously on coming in contact with atmospheric air.

No. 11. is a specimen of Gamboge, produced from a tree differing in appearance from the *Gambogia gutta*, L.

CAPT. JENKINS'S SPECIMENS.

A.	}	Two samples of each.
B.		
C.		

The standing Caoutchouc Committee having examined sundry specimens, submitted by the Secretary for their opinion, have agreed on the following:

REPORT.

1st. Specimens received from Dr. HELFER, and referred to in a letter addressed to the Secretary, dated at Moulmein, 12th June, 1837.

Your Committee are of opinion that Dr. HELFER's experiments have been successful in obtaining Caoutchouc only from three of the trees enumerated in the margin.

No. 10 may be pronounced the best. It is, moreover, the juice of a *Tree*, which it is important to keep in view.

No. 9 is a fair specimen of Caoutchouc, but the Committee are not sanguine as to much benefit being derived from its discovery. Dr. HELFER states that he obtained it from a *creeper*, and unless the quality was very superior, the comparatively

small proportion of juice would not be worth collecting. This inference is open to correction, on more definite information being afforded as to the nature, size, and other particulars of the creeper adverted to.

No. 3 appears to your Committee, Caoutchouc of an inferior description; and the process by which it was obtained is such as to render it very doubtful of becoming an article of any utility.

The Committee would here observe, that although Dr. HELFER's experiments are interesting, yet the process he describes is only calculated to yield a mass of vegetable albumen and gluten, totally different from *Caoutchouc* in the *valuable* properties of that substance, and resembling it only to such a degree as would enable us by a little skill to *adulterate* our Caoutchouc before sending it to the home market.

The Gamboge appears to be good, and the Committee would be glad to hear further from Dr. HELFER on this subject, when the flowering of the tree will enable him to determine its genus.

2. Specimens of Caoutchouc received from Capt. JENKINS, at Assam, accompanied by a letter to the address of Dr. WALLICH, dated 12th September, 1837.

Your Committee have examined these beautiful specimens of genuine Caoutchouc with great satisfaction. Capt. JENKINS informs us, that these samples were collected under the superintendence of Lieut. VETCH, and they certainly do him credit. This proof of one of the many great commercial resources abounding in Assam is highly encouraging, and enables your Committee to recommend the following resolutions, viz.

1. That the wooden block lately presented to this Society, with the bottle of Caoutchouc which accompanied it, be forwarded to Capt. JENKINS, with a copy of the printed instructions as to the mode of collecting adopted in South America.

2. That a premium of 100 rupees be awarded for a quantity of the best Caoutchouc, not less than one maund, made according to this pattern, and that the Caoutchouc so made be the property of the Agricultural Society, on the price of the day in

the Calcutta market being paid to Capt. JENKINS for the benefit of the producer.

3. That a premium of 50 rupees be offered for the best specimen of Caoutchouc, prepared over an earthen vessel (the quantity, not less than 10 seers) in the manner described in the printed instructions ; the said Caoutchouc to remain in the Society's possession without any allowance for value.

4. That the same scale of premiums be offered for the best Caoutchouc produced in any other part of India, and under the same conditions.

Your Committee regret that they have it not in their power to afford Capt. JENKINS any information as to the *value* of Caoutchouc in the Calcutta market, since it is altogether a new article, and has as yet been exported only by parties interested in keeping their proceedings quiet, but without wishing to inspire extravagant hopes of success, they feel justified in offering it as their opinion, that there is a ready market in England to take off a very large quantity, and that there would be no great difficulty in finding parties in Calcutta willing to make advances to a reasonable extent. The Committee would be glad however to ascertain from Capt. JENKINS, by actual test, at what rate it can be produced in Assam, per bazar maund, without which data it would be vain to hold out any inducement. The quantity of Caoutchouc exported from Calcutta up to the 30th April last, which may be taken as the total exportation of the article to that date, amounted to 514 bazar maunds, paying duty on a nominal value of 4,112 rupees, or 8 rupees per maund ; a valuation which your Committee believes to be far below the *market price*, if such market price were known, and which at present is known only to those who have advanced for and procured it from the forests.

The quantity exported since the 1st May, up to the present time is B. Maund—Your Committee, before concluding their report, desire to express their gratification at the continued and unceasing zeal with which Capt. JENKINS endeavours, by every possible means, to develop the resources of a country, where he has

been so happily located, and whose exertions prove the extent of benefit to be derived from the example of one individual who, besides his arduous and important duties, yet finds time, to devise plans for the happiness of a people who require only such a guide to lead them to comparative comfort and opulence, and to add materially to the ultimate increase of the State revenue.

N. WALLICH.

W. B. O'SHAUGHNESSY.

F. CORBYN.

RAM COMUL SEN.

RADHAKANT DEV.

JOHN BELL.

XXXV.—*Caoutchouc.*—B.

Further samples made under the same superintendence, and sent through the same channel.

[Read 3rd October, 1837.]

MY DEAR WALLICH,

I have sent by a packet under this date, another small quantity of Indian Rubber, prepared by my friend VETCH, which I hope will meet with your approval. I shall be anxious to get your report on this and the batch of the same kind sent before to you. VETCH thinks that he may soon be able to collect it at the rate of two or three maunds a week. I have no doubt that when the article once becomes a well established one of trade, we shall find the quantity to be gathered altogether from Lower Assam very considerable.

I wish you would let me know the price of such stuff in the market.

Yours sincerely,

F. JENKINS.

25th September, 1837.

XXXVI. -- *Report upon Caoutchouc.*

Referred to in the preceding note from Capt. JENKINS to Dr. WALLICH, marked (B) dated 25th September, 1837.

Further specimens of Caoutchouc prepared under the guidance of Lieut. H. VETCH.

A. Prepared in the same manner as that already reported upon by the Committee, only made thinner.

B. Also prepared in the same manner, more solid, about $1\frac{1}{2}$ inch thick.

C. Solid mass prepared, without the same advantages of the two former samples of gradually drying coat over coat.

The Committee having examined these samples, pronounce them to be of excellent quality, but they observe an omission in Capt. JENKINS's several valuable communications, which they would be glad to see supplied.

No mention is made of the name of the tree from which all these fine samples have been procured, and this is an important point to have ascertained.

The Committee would further desire to know the probable supply that might be expected from Lower Assam, supposing that due encouragement were held out for a ready sale. Capt. JENKINS alludes to this question, by stating that Lieut. VETCH may collect at the rate of 2 or 3 maunds a week, but the Committee would be glad if Capt. JENKINS could form an estimate, of what Lower Assam is capable of producing.

Note by Dr. WALLICH.

I cannot be quite certain, but I am *almost certain*, that the specimens that have lately come before the Society from Capt. JENKINS have been derived from the Indian Rubber Fig (*Ficus elastica* of Roxburgh.) My reason for not speaking with perfect conviction is this, that Capt. JENKINS has on one or two occasions intimated a doubt as to the Fig trees from which the milk had been taken being of one species only. I believe that

all the fine samples we have seen are of the *Ficus elastica*.

N. WALLICH.

These specimens are most excellent ; we approve of the Report.

F. CORBYN.

W. B. O'SHAUGHNESSY.

RADHAKANT DEV.

RAM COMUL SEN.

JOHN BELL.

XXXVII.—Maize.

The indigenous Maize of Nepaul, contrasted with the produce there of American seed, forwarded by the Agricultural Society of India, by Dr. A. CAMPBELL.

[Read 8th November, 1837.]

TO JOHN BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

MY DEAR SIR,

In continuation of my note, dated the 10th May last, containing some particulars of a comparison of the American Maize with the Nepaul article, I have now the pleasure to inform you that I have been so fortunate as to procure a small crop from both kinds of the American seed you sent me ; and that on comparing the produce with the native article, I am inclined to believe that the introduction of the new world grain, into this country, (Nepaul) will probably be attended with advantage to the people. This opinion, formed on the result of a single small experiment, cannot, of course, be considered conclusive, although it is sufficient to induce me to make further efforts for the dissemination of these varieties throughout the mountains. More extensive trials, which I purpose making next season, and the decision of the cultivators will settle the matter.

Accompanying this you will receive four complete cones of Maize, recently cut from plants grown in a fertile light soil,

close to one another, and under completely similar circumstances of culture.

No. 1. is the produce of the Canada Maize sent me by you.

No. 2. that of the Boston.

No. 3. is the yellow variety of Nepaul Maize; and

No. 4. a specimen of the white variety. All these four kinds were sown on the 15th of May last, in drills, 20 inches apart, the seeds in each drill 24 inches asunder. The two American sorts were previously steeped in water, and planted out, as germination had commenced. The Nepaul grain was sown dry, as is the usage of the cultivators of the country. The Boston Maize appeared above ground, along with the Nepaul one, on the 6th or 7th day. The Canada was several days later. The Canada plants grew to the height of 9 and 10 feet; each plant giving one ear (3 out of 40 only having had 2 cones). The Nepaul plants were nearly as strong and tall, and had about the same proportion of double cones. The Boston plants grew only to the height of 4 and 5 feet; were very slender compared with the other kinds, but had a greater proportion of double cones on them. This last grain (the Boston) ripened in a little more than 3 months; being a month earlier than the Nepaul plants, and six weeks earlier than the Canada ones.

The Society on comparing the cones now sent, will be able to give an opinion on the relative value of these grains, and to compare them with the maizes of the plains. I am disposed to think the Canada superior to the Boston and Nepaul, as an article of food, from the greater thinness of the husk, and purer white colour of the flour; and from what I have seen of the general produce of Maize within this valley, and on the neighbouring hills, I consider the Canada a more productive grain, than any of the Nepaul varieties. The *cone* is nearly twice as large, and the *grain* at least a third larger.

The more rapid growth of the Boston grain, suits it admirably for a first crop, where previous scarcity renders an early supply of food necessary; and the smallness of its straw, would indicate its suitability for light, and poor soils. The cone of

the Boston grain is smaller in circumference than either of the others, but quite as long, and the grain as large as the Nepaul one, but less than the Canadian. Some of the Boston cones produced, were 9 inches long; none of the Nepaul ones were so long, nor any of the Canada ones longer.

I have not any of the original American seed to enable me to compare it with its produce here, but from my recollection of the Canada grain received from you, I think the produce has somewhat degenerated in size. The Boston grown here is I think quite as fine a grain as the original seed. As you have doubtless some of the American Maize by you, I hope to hear the result of your comparison of it, with the produce of this place now forwarded.

A. CAMPBELL.

XXXVIII. — *Minute on Guinea Grass, by the Secretary.*

[Read 8th November, 1837.]

A Resolution was passed at a General Meeting of this Society, on the 12th July last, with a view to encourage the growth of good fodder,

1. That a premium of 200 rupees and the gold medal be awarded for the best Guinea grass cultivation, 20 beegahs.
2. That a premium of 100 rupees and the silver medal be awarded for 10 beegahs of the best Guinea grass.
3. For one maund of seed from such cultivation, a premium of 100 rupees.
4. For 20 seers of seed from ditto, a premium of 50 rupees.

With reference to these resolutions, I now place myself in the position of a competitor for Nos. 2 and 3.

For No. 2 as possessing a cultivation of 10 beegahs and upwards.

For No. 3 as having already gleaned from this cultivation 123 lbs. of well cleaned and perfectly dry seed, which is now presented.

In order to settle the point as to extent of cultivation, I beg to invite any members who may feel disposed to drive down to my garden.

I may here remark, that when the resolution was framed and passed, I had not more than 20 cottahs in Guinea grass; and I mention this circumstance to show what may be very easily accomplished, if we only *determine* to carry an object into effect.

I have for many years cultivated Guinea grass, in at least 30 different spots in and out of Calcutta, without reference to soil, and in no one instance have I failed to obtain an endless succession of crops, as luxuriant as I ever saw it in the West Indies. Why, then, can it not be generally cultivated throughout India?

I have heard many say, it will answer well enough for garden cultivation, but it will not, on a grand scale, bear the withering heat of a Bengal May sun; that it is an expensive cultivation; and in short, that it is every thing, except what it *really* is, a most nourishing grass, and one which I feel satisfied will amply repay a *little care* and a *little expense at first*.

Another excuse made for not cultivating Guinea grass, is, that it requires *fencing*; but will those who offer such objection say if it is more liable to trespass than wheat, paddy, or any other crop?

Admitting, however, for the sake of argument, that it does require a *babool*, or any other cheap fence, will the labour of cutting thorns, or even the expense of a bamboo fence, not be amply repaid by the first crop of such an enclosure?

I feel persuaded that parties who bring forward such obstacles, have never given this grass a fair and unprejudiced trial; for there is no *weed* more easily cultivated, and now a fair opportunity is afforded by the large supply of seed which I have the gratification of presenting to the Society, for whether I may be a successful candidate for the prize or not, the object I had specially in view, of placing within the reach of all, an ample supply

of good seed, has been effected. I hope to see at no distant date, every Indigo Factory with its cultivation of Guinea grass, and every native village interspersed with patches of it; for where there is room for planting the sola, the ole, and other sorts of cutchoo, there is ample room for Guinea grass, to maintain a couple of good milch cows, the produce of which in ghee alone would support all the inmates.

But assuming a wider range of utility, it has been urged, that we want a grass that will yield abundantly, when all others are parched up. This I admit would be a great desideratum, but I fear we must look long for such a prize, and we might just as well attempt to reverse the order of nature's laws.

To ameliorate the misery which her laws inflict, is however within our reach, and this great object cannot, in my opinion, be more easily effected than by introducing a judicious cultivation of Guinea grass.

With this view, I beg leave to offer a few remarks on the best method of obtaining this result.

1. If seed is to form the nucleus of a park, prepare a small bed, as for cabbage or turnips; let the soil be well pulverised, scatter the seed pretty thickly, and rake it in, or in the Bengalee fashion, let the mallee knead it, so that it may mix with the surface soil.

If the sun is powerful, adopt the method in use of protecting cauliflower seeds from the rain; this is all that is necessary to secure a good bed of plants.

2. The plot which is intended to receive the plants, should be dug *at least* a foot deep; then smoothed with the native harrow; line off the ground three feet apart, and transplant the seedlings in even rows, either one foot apart, or in continuous line according to the richness of the soil. Water the young plant every evening for a week (if the weather be dry) until they take hold of the soil, and keep them free from weeds. A second weeding is advisable, for a *little* extra trouble and expence will be amply repaid, and will give your grass an advantage over the weeds which it will maintain ever after.

This is the whole process; and those disposed to try it, will only wonder why they did not try it before. Such a cultivation will give four good crops in the course of the year, and the quantity of grass will be the best criterion of a profitable return.

3. It has been said that it does not yield good hay. This appears to me a serious error; it affords most nutritious fodder for both horses and horned cattle, but it must be cut at a proper season, when neither too young, nor too hard, and there can be no greater difficulty in attending to this, than in marking the proper time to cut indigo or paddy.

I have succeeded in rearing Guinea grass from seed at all seasons, but the best is undoubtedly the month of July, for then you have only the labour of planting and weeding, whereas during the hot months, the labour and expense of watering are to be taken into consideration. But to secure a nucleus is the grand object, as, if the seed is not *carefully* preserved loose in tin, it will disappoint the intended grower and then follows the oft told tale, "I have tried it, but it wont answer."

Once establish a nursery of plants, and if the least sanguine will not succeed after following the method I have laid down, I will submit to the imputation of not only having deceived myself, but of having done much worse—deceived the public; an imputation I am by no means covetous of.

JOHN BELL.

Calcutta, 6th November, 1837.

XXXIX.—*Cloth made of Wild Silk, produced by the worm which feeds on the Castor Oil plant in the district of Dinag-pore.*

[Read 8th November, 1837.]

MY DEAR SIR,

I have the pleasure of sending you a specimen of cloth

made of silk spun by the worm which feeds on the castor oil plant.

The peasantry in this district rear the insects to procure the cloth for their own use; they seldom take it to the markets, and I believe it is never exported from the district.

Enclosed are two specimens of plants, which I shall be obliged if you will take an opportunity of giving to Dr. WALLICH, with the note addressed to him.

Believe me to be,
My dear Sir,
Yours very truly,
E. BENTALL.

Dinagapore, 16th October, 1837.

XL.—Lichens.

Communications from the Royal Asiatic Society of Great Britain and Ireland, and from the Asiatic Society of Calcutta, on the importance of drawing general attention to the subject of Lichens.

[Read 8th November, 1837.]

TO J. BELL, Esq.

*Secretary to the Agricultural and Horticultural Society
of India.*

SIR,

I am requested by the Committee of Agriculture and Commerce of this Society, to acknowledge the receipt of your circular letter of the 4th of April, 1836, and to intimate to you their wish to correspond with your Society on all subjects of mutual interest to the respective institutions.

The Committee have forwarded to the Government of Bengal, specimens of the different species of Lichens employed in Europe for the purposes of dyeing, expressing their opinion that several valuable sorts may be found in India, well adapted

for that purpose, and soliciting the aid of that Government in diffusing a knowledge of the value of such productions among the people of India. In furtherance of this object, I have to request that you will have the kindness to transmit to the Committee any specimens of Lichens now used in dyeing by the natives; or any other of the productions of India which may appear adapted to the same object, for the purpose of being submitted to experiment here.

I hope shortly to have the pleasure of sending you a few copies of the proceedings of the Committee.

I have the honour to be,

Sir,

Your most obedient,

humble servant,

H. HARKNESS,

14, Grafton Street, Bond Street,
London, 11th May, 1837.

Secretary.

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,

I am directed by the Asiatic Society to communicate through you to the Agricultural Society, copy of a letter addressed to the Right Honourable Lord AUCKLAND by the Secretary of the Royal Asiatic Society of London on the subject of the dye extracted from the Lichens of various countries. His Lordship has requested the Asiatic Society to promote the enquiry desired by the London Committee into the nature and quality of the Lichens procurable in this country, and to collect specimens for transmission home, which will immediately be done through such of its members as may be conveniently situated for the purpose. At the same time the Society is sensible that the object is one of equal interest to the Agricultural Society, and that both in a scientific and in a commercial point of view, it will be sure to meet with attention from the zealous and wide-

ly scattered associates of this flourishing Institution. I have therefore the honour to hand to you five copies of the first part of the proceedings of the Committee of the Royal Asiatic Society, in which is some notice of the Lichen dye and of the mode of extracting it by an ammoniacal liquid, in order that you may make them public through your Society's proceedings.

The specimens of plants and of the solution alluded to in Capt. HARKNESS' letter to Lord AUCKLAND, are deposited in the Asiatic Society's museum, where they will at all times be open to the inspection of members of the Agricultural Society.

I have the honour to be,

Sir,

Your most obedient servant,

J. PRINSEP,

*Asiatic Society's Apartments,
2nd November, 1837.*

Sec. As. Soc.

TO THE RIGHT HONOURABLE LORD AUCKLAND, G. C. B.

Governor General of India.

MY LORD,

The Committee of Agriculture and Commerce of this Society, having had before them certain specimens of Lichens used in dyeing, and being informed that several species are now employed in India for that purpose, and that many more would probably be elicited by a close investigation, and an accurate knowledge of the requirements of the trade, which has been much checked by the short supply, and high price of the best sorts used, I am requested by the Committee to transmit to your Lordship the accompanying specimens of Lichens, with bottles of the ammoniacal liquor used in extracting the colour, and of the extracted colour; and to enclose fifty copies of the first day's proceedings of the Committee, which contain directions for ascertaining the most useful sorts of Lichens, and for using the liquor as a test of their quality. I am also requested to solicit that such measures may be adopted as may appear to Your

Lordship to be expedient to diffuse amongst those to whom it is likely to be useful such an acquaintance with the subject as may tend to advance the views of the Committee.

As the Committee are impressed with the conviction that their views of general utility are fully shared by your Lordship, they feel it unnecessary to offer any apology for the trouble which may be occasioned in furthering a measure calculated to lead to the improvement of our commerce, and to be of general advantage.

I have the honour, &c.

H. HARKNESS,

Secretary.

(True copy) JAS. PRINSEP,

Sec. As. Soc.

XLI.—Extract from the Proceedings of the Committee of Agriculture and Commerce of Great Britain, dated the 8th February, 1837.

Read the following communication :

1st. From MR. HARMAN VISGER, of Bristol, on Lichens, with specimens, &c. &c. and expressing his conviction that the extensive regions of the East must produce, in abundance, some of the known, and many of the unknown, though probably not less valuable Lichens available for dyeing ; that a large and certain supply of good sorts would greatly stimulate the consumption, which has been much checked by the short supply and high price of the best-known Lichens used for dyeing ; that, at present, he estimates the annual import at from 60,000*l.* to 80,000*l.* ; that he would be happy carefully to test any specimens that may be sent to him, and to report on them ; and that he had sent to the Committee such specimens of Lichens as he had then been able to procure, with a list and paper of instructions, not confined mere-

ly to them, but comprising others which he would send as soon as he could procure them.

2nd. From Mr. SOUTHEY, of Coleman Street, on East Indian Wool, with specimens, &c. &c.

3rd. Extract of a letter from Messrs. FORBES and Co. of Bombay, on Indian Iron.

Resolved,—That the thanks of the Committee be returned to these gentlemen for their kind attention; and that the list of Lichens and paper of instructions drawn up by Mr. VISGER, and the letter from Mr. SOUTHEY, be printed in this day's proceedings.

Resolved,—That the specimens of Lichens furnished by Mr. VISGER, of the ammoniacal liquor for extracting the colour, and of the colour required, be sent to the different Presidencies of India, and to Ceylon and China, through the medium of the home and local Governments, and to the several Horticultural and Agricultural Societies already established in India; and that fifty copies of the Committee's Proceedings of this day accompany each assortment of the specimens.

Resolved,—That the subject of Mr. SOUTHEY's communication on East India Wood, and of the extract of a letter from Messrs FORBES and Co., of Bombay, on East Indian Iron, be allowed to lie over until the result of the examination of the expected investments of those articles be known.

Read a letter from the Horticultural Society of London, dated the 31st ultimo, enclosing a paper of proceedings of the Meerut Horticultural Society, and the report of the members of the Committee to whom these communications had been referred.

Resolved,—That extracts from the paper of proceedings of the Meerut Horticultural Society be published in the Committee's proceedings of this day; and that in all similar cases, papers be referred to particular Members for their report thereon.

Professor ROYLE suggested that specimens of the species of Lichens used in India for the purpose of dyeing (one of which is extensively employed in the Northern provinces, and is there

called Chulcheleera,) be obtained, and sent to Mr. VISGER for the purpose of being submitted to experiment.

Resolved,—That the Committee take measures to obtain specimens of those Lichens ; and that they be sent to Mr. VISGER for experiment.

An offer was made by Professor ROYLE, to furnish a list of all the plants of India which yield oil.

A similar offer was made by Colonel SYKES, with reference to the plants of the Dekkan which are suitable to the purposes of domestic economy.

Professor ROYLE also promised to prepared a paper on the subject of Caoutchouc, and to submit it to the Committee, at as early a period as his present numerous avocations would permit.

Resolved,—That the Committee will be happy to avail themselves of the kind offers of Professor ROYLE and Colonel SYKES.

Resolved,—That J. G. MALCOLMSON, Esq., be nominated a Member of the Committee.

Resolved,—That letters be addressed to the Horticultural and Agricultural Societies of India and of England, expressive of the wish of this Committee, to enter into communications with them on all subjects of mutual interest to the respective institutions.

LIST WHICH ACCOMPANIED MR. VISGER'S SPECIMENS OF
LICHENS, &c.

“ Lichens of Commerce.”

No. of Specimen.	Commercial Name.	Botanical Name.	Value per Ton.
1.	Canary Orchilla Weed,	Lichen Rocella ...	259 <i>l.</i> to 350 <i>l.</i>
2.	Cape de Verde ditto		200 to 300
3.	Western Island ditto		150 to 230
4.	Madeira ditto		100 to 150
5.	African ditto		80 to 120
6.	South American ditto		80 to 120
7.	Sardinian ditto		30 to 45
8.	Cape of Good Hope ditto		20

9.	English ditto .....	.....	No commercial value
10.	Canary Rock Moss, Unknown	80 to 90	
11.	Sardinian ditto	(supposed) Pustulatus 70 to 90	
12.	$\left\{ \begin{array}{l} \text{Pustulatus ditto, of} \\ \text{Sweden, Norway,} \\ \text{and England.....} \end{array} \right\}$		$\left\{ \begin{array}{l} \text{Lichen Pustulatus,} \\ \text{or Gyrophera} \end{array} \right\} \quad 20 \text{ to } 40$
13.	Tartarous Moss	Lichen Tartarus ...	20 to 40

" Lichens liable to be mistaken for those of Commerce, but possessing no value.

No. of Specimen.	May be mistaken for	Points of Difference.
21.	Nos. 1 to 9.	The bad is flat, and has a bitterish taste; the good is cylindrical, and not bitter.
22.	No. 12.	The difference is apparent, but the Villous is generally more or less mixed with the Pustulatus whenever collected.
23.	No. 10.	The great similarity between the good and bad Canary Mosses, renders the collection of the good a matter of some difficulty.

" The Good has a nearly white powder on its surface, towards the centre; the under surface is of a gray colour, and is not hairy; if wetted it does not turn of an orange colour; its edges are flat and thin.

" The Bad has no mealy white powder on its surface; its under side is hairy, and blacker than the good; its edges are usually more or less knobbed, and on being wetted, it generally becomes of an orange colour.

" No 24, contains a mixed sample of good and bad, which has been wetted with water.

"The useless Mosses greatly outnumber the useful, and vary from each other, in some instances, by such slight shades of difference, that the above specimens of them can serve little more than to call minute attention to the subject. A *test* for the discovery of colour is therefore necessary.

" Test.—Take liquor ammoniæ, very much diluted with water, but strong enough to retain a powerfully-pungent smell—half-fill a phial bottle with the same, then add of the Lichen (being broken up to a convenient size), so much as will lightly

fill up the liquor, so that the whole may be readily stirred about. Care must be taken to leave at least one-third of the bottle for air. The bottle must be kept corked, but be frequently opened, and the contents stirred with a small stick. The colour will begin to exhibit itself in a few hours, and the more rapidly in proportion to the warmth of the place in which it is kept ; but the heat should not exceed 130° Farenh. A piece of white silk placed near the surface of the fluid will show the colour before it would otherwise be perceptible. This test will only serve to show where colour exists, but will not develop it to its fullest extent.

“ *Localities.*—The good sorts are generally found in rocky or stony districts, or where dry stone walls abound ; in the neighbourhood of the sea,—or if distant from the sea, in places exposed to sea breezes. The more valuable are met with in volcanic islands. My own experience has been principally in the Canaries, where I find the more arid the situation, the better the quality of the Lichens. When the land is high and humid, the useless sorts alone are met with. In dry places near the sea, there are only the good sorts ; and there is generally a belt between the two, in which both good and bad are found on the same stones, and not unfrequently overrunning each other.

“ There is with the samples a small bottle of ammoniacal liquor, of the strength suited for test ; and also a small bottle of the colour to be produced.”

For the plates which accompany these remarks, the Agricultural Society of India is indebted to Dr. ROBT. WIGHT, of Madras, an extract of whose letter, to the address of Dr. WALLICH, under date, November 13th, 1837, is herewith annexed.

“ My object in now writing to you, is to send you a specimen of my Lithograph of the Dye Lichens for presentation to the Agricultural and Horticultural Society, and to say, that if it should be esteemed a desirable addition to their next volume of Transactions, I think I can supply 500 copies for that purpose.

“ Now pray lose no time in letting me know the result, as I am as yet but indifferently supplied with lithographic stones,

“and it is no small loss to be deprived of the use of such an one as that from which the impressions have been taken.”

Memo.—The Secretary having submitted Dr. WIGHT's offer to the Committee of papers, was directed to accept it, with the Society's thanks.

XLII.—*Report on the Tea Plant of Upper Assam, by W. GRIFFITH, Esq. Assistant Surgeon, Madras Establishment.*

[Submitted 8th November, 1837.]

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,

I am directed by the Tea Committee to forward to you, for the purpose of being laid before your Society, an highly interesting and valuable report by Mr. GRIFFITH, on the Tea plant of Assam, which they doubt not will be found worthy of being inserted in the Society's Transactions.

2. The drawings belonging to the above Report have not yet been returned by the Government. As soon as they are received, they shall be forthwith transmitted to you.

I have the honour to be,

Sir,

Your most obedient servant,

N. WALLICH, M. D.

Secretary.

Tea Committee Office, H. C. Botanic Garden,

16th October, 1837.

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,

With reference to paragraph 2nd of my letter of the 16th instant, I have now the pleasure to forward the accompanying two

botanical drawings, and three maps belonging to Mr. GRIFFITH's report, which have been received to-day from the Revenue Department.

I have the honour to be,

Sir,

Your most obedient servant,

N. WALLICH, M. D.

Secretary.

Tea Committee Office, H. C. Botanical Garden,

24th October, 1837.

XLIII.—Report on the Tea Plant of Upper Assam.

PREFACE.

The accompanying revised report has been drawn up without reference to the original one, which was made under very disadvantageous circumstances. For as Dr. WALLICH had expressly given me to understand, that as no responsibility attached to me while on deputation, so I should not be called upon for a report, I did not avail myself of the means, which otherwise I should certainly have done, of providing myself with the necessary books for consultation. The present report is avowedly incomplete; I have, however, bestowed on it all the attention which my short residence in Calcutta has permitted.

WILLIAM GRIFFITH,

Asst. Surg. Madras Estab.

late Member of Assam Deputation.

PART I.

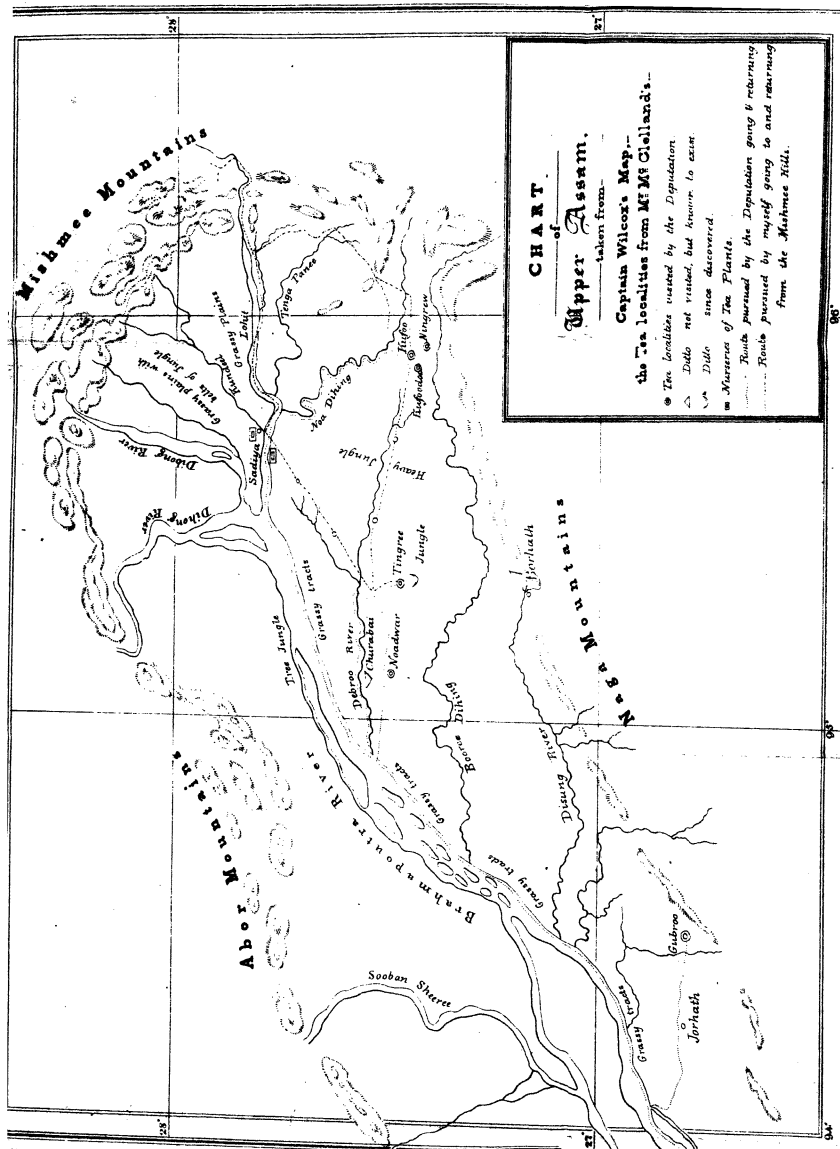
Movements of the Deputation; enumeration of the Tea Localities, with general remarks on these, and on the appearance of the Tea Plants.

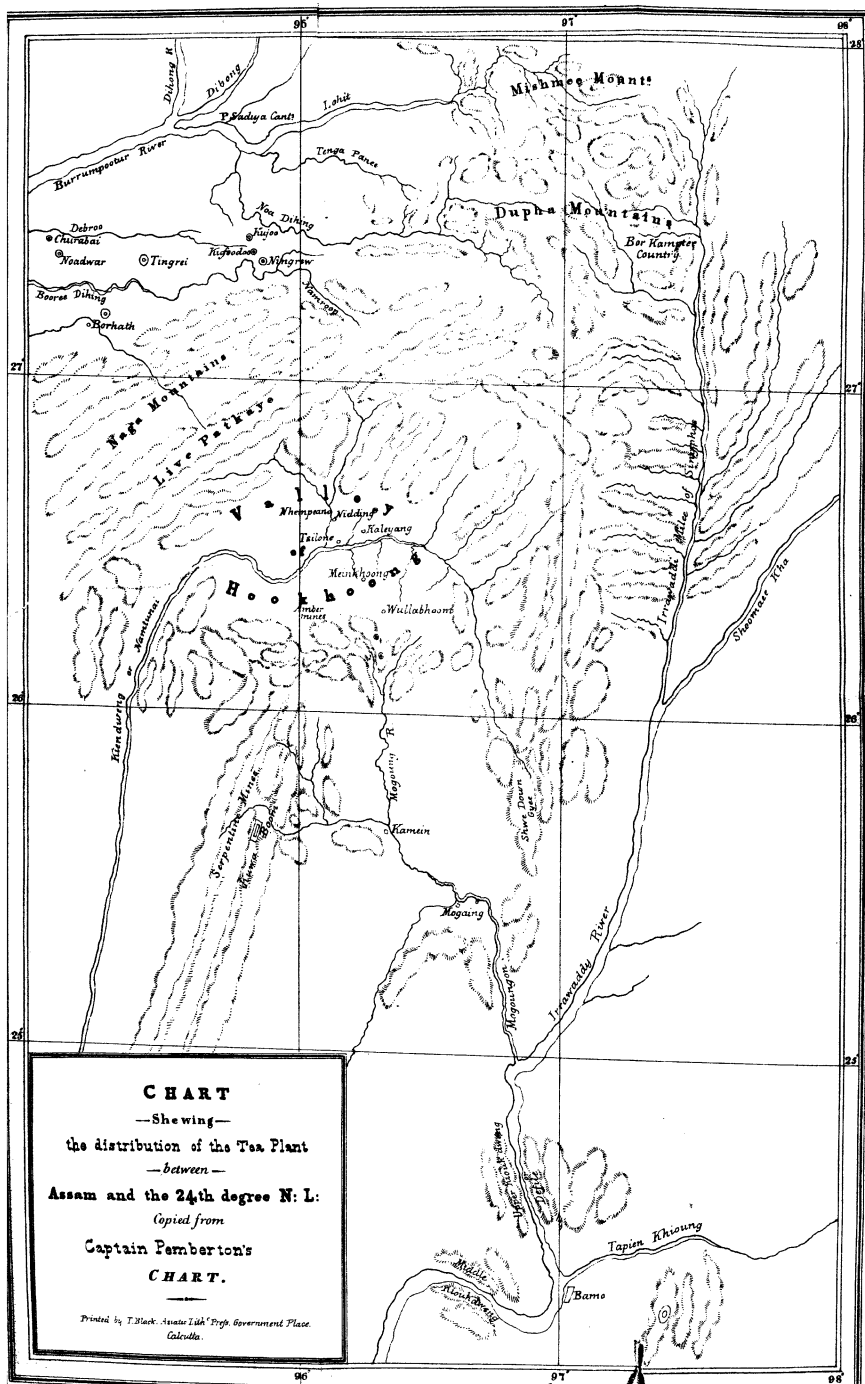
In consequence of the discovery, at the latter end of the year 1834, that the genuine Tea plant was indigenous to Upper Assam, and of the representations of Capt. JENKINS, the agent to the Governor General on the North East Frontier, the Supreme Government came to a determination of having the tracts of country, producing the plant in question, properly examined. The officers selected for this purpose, viz. that of enquiring into the physical condition of the Tea plant, were Dr. WALLICH and myself, as botanists; and Mr. McCLELLAND, as geologist.

The deputation left Calcutta on the 29th August, 1835, and arrived at Sadiya, the frontier station of Upper Assam, early in January, 1836, having traversed *en route* the Khasia range of mountains, on which considerable collections were made in Botany, and most extensive ones, great portions of which were entirely new, in geology. The deputation left Sadiya for the Singpho Tea tracts, on the 11th January, and arrived at Kufoo on the 15th; on the following day the Tea was first seen in its native state. On the 19th it arrived at the Tea tract on the Manmoo, and by the 29th it had reached Sadiya, visiting on its return Choonpoora, 12 miles above Sadiya.

On the 6th February it left Sadiya for the Tea tracts in the Muttack country; it visited Chykwa for the purpose of selecting a fit spot for the nursery for the Chinese plants that had been despatched from Calcutta; and it arrived at Nadowar on the 17th, and at Tingien on the 23d, and returned to Dibroo Mookh on the 28th.

Leaving this place finally on the 1st of March, it reached Jorhauth on the 4th, and Gubroo Purbut on the 8th, on which day the Tea was examined for the fifth and last time. On the 9th





Dr. WALLICH left, carrying with him Mr. BRUCE who had accompanied, as guide, the deputation, for the purpose of being present at a general meeting of the authorities of Assam, which had been convened (partly) for the purpose of settling every question regarding the Tea. Mr. McCLELLAND and myself, whose presence was not deemed necessary on this important occasion, availed ourselves of the opportunity of visiting the Naga Hills. On these we remained, having ascended to an elevation of about 1100 feet, until the 12th, when we returned to Gubroo; we arrived at Bishenath on the 19th, too late, however, for the consultation, as the meeting had broken up the day after, I believe, the arrival of Dr. WALLICH. About the 21st, the members of the deputation dispersed. At the expiration of this period the deputation had been in Assam nearly four months, of which about two were passed on a most uninteresting river, the Burrampootur. And in addition to this disadvantage it returned in every instance, but one, by the same route. Of this I may be allowed to adduce one instance; the time passed, including delays from bad weather and other causes, between Ningrew and Tingrei, amounted to 26 days; the actual distance over land is barely 45 miles, and this, as I have ascertained by experience, is easily travelled over in three days and a half.

The places at which the Tea plant was examined in its native state by the deputation, were five in number. Of these, Kufoo and Ningrew are in the Singpho country, but considerably within the British boundary; Nadowar and Tingrei are situated in the Muttack or Bengmora country, belonging to an Independent Native Rajah, known by the name of the Burasenaputee, but under the controul of the British authorities, and Gubroo Purbut, the last locality, is within the territory of Rajah Poorundur Singh. To these localities it is impossible to give any appellation, as marking their external features. Hence the term, "Tea Forests," which has been made use of by some, is totally incorrect, for the Tea plant never, in any of the above places, exceeding the size of a small tree, and almost invariably occurring as an ordinary sized shrub, cannot be expected to

give that appearance to the spot it occupies, that can alone be designated by the term "Forest." The above five places are comprehended in a tract of country situated between the parallels of about $27^{\circ} 25'$ and $26^{\circ} 45'$ north latitude, and 96° and $94'$ of east longitude; Ningrew and Gubroo Purbut forming the extremes of longitude, and Tingrei and Gubroo the extremes of latitude.

On my return from the Mishmee Hills, I visited a Tea tract, distant about three miles from Kufoo-doo, and barely a mile from the road by which the deputation proceeded to Ningrew. Mr. BRUCE has the merit of having first made known the existence of this new site.

Enumeration of the Localities.

1. *Kufoo*. The Tea occurs in a jungle to the south of the village Kufoo, or as it is more generally called, Khoon-long, and at a distance of about two miles from it. Its extent can scarcely equal that of 200 yards square measurement. To the eastward it terminates abruptly; in other directions it ceases by degrees. It is here that the plant reaches its maximum of size, that is, compared with its stature in the other tracts visited. The ground is intersected with numberless small ravines, and curious looking mounds exist here and there, chiefly around the bases of the larger trees or the clumps of bamboos. The soil is loose, light, and of a decided yellow. The road from the village to the spot occupied by Tea, crosses the Dibroo, and winds over low eminences before coming on the Tea itself: still the situation is low, and very damp.

2. *Kufoodoo*. The Tea tract lies to S. W. of the village, from which it is distant about three miles; it is to the westward of and about a mile from the path leading to Ningrew. On diverging from this path I passed through some low jungle, which is always in these parts characterised by the presence of a spiny Palm, a species of *Zalacca*, and then after traversing some rather higher ground, I arrived at the Tea. The extent of ground occu-

pied by the plant is about 150 yards in length by 40 or 50 in breadth; its direction is north and south. The plants were very abundant, and in excellent condition; they cease abruptly in every direction, and this was distinctly ascertainable, as the Gam had cleaned away all the underwood and many of the smaller trees. The plants were generally of the size of middling shrubs, none were arborescent. All were loaded with flowers and young fruits; this excess, so to say, of the development of flowers being probably dependent on the moderate exposure of the plant to the influence of the sun.

Although the spot is decidedly low, yet it was told, on enquiry, that it was not usually overflowed during the rains. The soil, which was at the time of my visit dry, is cinereous grey on the surface; at the depth of a foot it is brown, and this passes, as one proceeds deeper, into a more and more decided yellow; at about 4 feet it passes into sand. It is light, friable, easily reduced to powder, and has a very slight tendency to stiffness. No ravines exist, although a few mounds are visible about the bases of the larger trees.

3. *Ningrew* or *Ningrew-la*. The Tea occurs here in a small elbow of land nearly surrounded by a small nullah, the Manmoo. The site bears about N. N. E. from the village Ningrew from which it is distant about two miles. The whole tract occupied by Tea is rather elevated, but still it is very moist; the surface is similarly, but in a less degree, intersected by ravines as at Kufoo, and the soil, so far at least as regards external characters, is much the same. The extent is greater than that of Kufoo, and the plants are more numerous and of smaller size. They are most abundant to the North and East, being distinctly limited to the westward; none are reported to exist on the opposite bank of the Manmoo.

This locality is close to a portion of the Naga range of mountains which form the southern boundary of the valley of Assam.

4. *Nadowar* or *Naddoa*. The Tea here occupies a very small patch of soil on the slope of a heavy jungle, and elevated only

3 or 4 feet above a narrow belt of swamp which encircles it for two-thirds of its extent. It bears S. W. from the village of the above name and is about three miles distant from it. The extent occupied by Tea does not exceed 50 yards by 25; towards the southern extremity of this it is excessively abundant. Towards the northern part the plants diminish gradually; towards the south they cease abruptly, being stopped by the swampy belt before mentioned. To the east the same cause operates; to the west they cease as suddenly, but without any obvious cause. Scarcely a plant, indeed, is visible to the west of a small path which skirts the part occupied by Tea. The soil, particularly of that portion on which the plants were most abundant, was of considerable depth; it was light and of a decided yellow, passing below into sand.

5. *Tingrei*, is a poor village about 10 miles to the S. E. of Rangagurrah, the capital of the Muttack country. It is situated on the western bank of a rivulet of the same name, a tributary of the Debroo. Close to this the plant is found in greater abundance than at Kufoo and Ningrew, and to a greater extent than at any of the localities. It grows indiscriminately on rather high ground, and on clumps of earth in low ground, which is intersected in every direction by ravines, and which is probably occasionally flooded. But it attains to greater perfection on the first mentioned places.

A small space likewise exists on the banks of the *Tingrei* nullah, which was thickly covered with stumps of Tea plants, some of considerable size; this spot had been cleared and had been used once for paddy cultivation. This small space, on which the Tea is distinctly limited, is separated from the larger tract or patch by a small water course, and on either side of this larger patch considerable clearings occurred on both banks of the water course, which was excessively tortuous; the Tea was abundant. Its general direction was south east, its extent in this direction being about a quarter of a mile; its width being always inconsiderable.

No arborescent specimens existed, and the plant has, generally speaking, diminished in size, when compared with those of Kufoo or Kufoodoo. I considered these plants, all of which have been since cut down, as the finest of any I had then seen, their crowns being usually much more developed.

The soil was of a yellowish brown tint, the yellowness, as well as the stiffness, increasing with the depth to a certain extent, beyond which it passed apparently into nearly pure sand; it was as usual characterised by a certain lightness. That of some of the lower portions was covered with a thin superstratum of black soil, probably derived from the decomposition of vegetable matter. The western and eastern limits of this locality were well defined, but to the south the plant continued to straggle along the direction of the water course. Both the Tingrei and Nadowar tea localities are at a greater distance from the Naga range than either those in the Singpho district, or that in the Raja's territory.

6. *Gubroo Purbut*. This is the only situation on which the Tea has, I believe, yet been seen in Assam, that would indicate the probable ascent of the plant to more elevated situations. At this place it is found on a low rounded hill, certainly not exceeding (at least on the part occupied by Tea) 40 or 50 feet in height, which forms the commencement of part of the lower ranges of the Naga chain. This Hill bears north west from the village of Gubroo, to which it is quite close; the direction in which the plant occurs is from north west to south east; it is distinctly limited, for perhaps two-thirds of the extent, by low swampy ground, used for rice cultivation. In the direction of the neighbouring Hills it passes off more gradually, but it does not cross the brow of the Hill, along which a path runs. The plant is not abundant, and has lost its tendency to become arborescent. The soil is deep, approaching in external characters to that of the higher portions of the Tingrei Tea tract.

General remarks on the extent of the Localities, their natures, and the appearance of the Plants.

From the above enumerations it is at once evident, that in all the above localities, to which the term patches is perhaps most applicable, the Tea plant is distinctly limited in extent. This is the more worthy of notice as pointing out the absolute similarity in the habits of the Assamese and of the Chinese plants, which to use Ellis's own words always occur "in small patches." But although the localities are limited in extent, it does not appear that they are so in number. At the time of the visit of the deputation, the plant was known to exist at Borhath on the Disung Nuddee, and on the banks of the Debroo, between Rangagurrah and Debroo Mookh, at a place called Cherabei; and since that time Mr. Bruce has ascertained the existence of several more, chiefly along the Booree Dihing and about Tingrei; he has likewise received information of the existence of others. The Tea plant may, therefore, be looked upon as one of the common plants of a large portion of Upper Assam. A glance of the chart, which is enlarged from that of Captain Wilcox,* will at once shew that almost all the Tea localities occur within very short distances of each other, the only gap of any extent being that between Borhath and Gubroo Purbut, which is nearly 60 miles in length. Now, although I am not aware that it is even reported to exist in this direction, yet the Tea plant is one so ill adapted for even moderately interrupted dispersion, both on account of the structure and weight of the seeds, as well as the ease with which the germinating principle is destroyed, that I have no doubt that connecting patches will be found between the points alluded to, and that in forming the abovementioned and necessary connection, the plant will follow throughout nearly two-thirds of the gap, the Disung Nuddee.

* The Tea localities being laid down from that of Mr. McClelland.

Nature of the Localities.

All these, with the exception of Gubroo and Ningrew, occupy low spots, and the former is perhaps the only one which is always exempt from inundation. The wetness of the four first during the rains could not well be exceeded, and although Gubroo is, as I have said, not actually wet, it is excessively moist. During the cold weather even, they maintain their character for humidity. That of Kufoodoo is the only one near which I saw no water-course or stream, but then its situation is certainly lower than that of Kufoo or Ningrew. All may be characterized as presenting an excess of humidity. On this subject I cannot do better than refer to Mr. McClelland's report, p. 35, which is highly deserving of attention. The localities are in every instance clothed with excessively thick tree jungle, the trees in almost every case, being of moderate size. Under shrubs and herbaceous plants, such love shade, are found in abundance intermixed with the Tea plants. In some of the localities bamboos are of common occurrence. So thick, indeed, are these jungles, that it is much to be doubted whether the Tea plant, not even excepting the arborescent ones, ever receives the direct rays of the sun.

Nature of the Soil.

For excellent remarks regarding the soil of these tracts and the peculiarity of their natures, I must refer to Mr. McCLELLAND's report. Their prevailing characters are lightness and porousness; the prevailing colour is yellow or reddish yellow, which generally becomes more developed as the depth increases, up to a certain point, when they pass into sand. The chief characteristic of the surface is its intersection by numerous ravines and hollows, the spaces between which often assume a conical shape, frequently forming mounds round the bases of trees and clumps of bamboos. The presence of these which are proofs of the lightness of the soil, Mr. McCLELLAND satisfac-

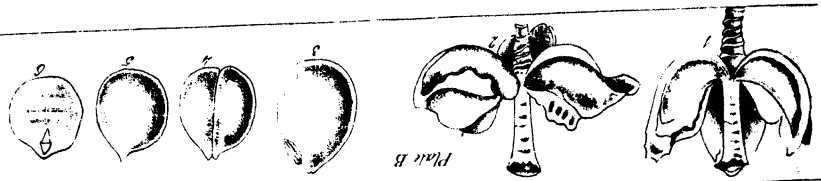
torily explains, by the action of water collected on the foliage of trees, and being thence precipitated in heavy volumes.*

Appearance of the Plants.

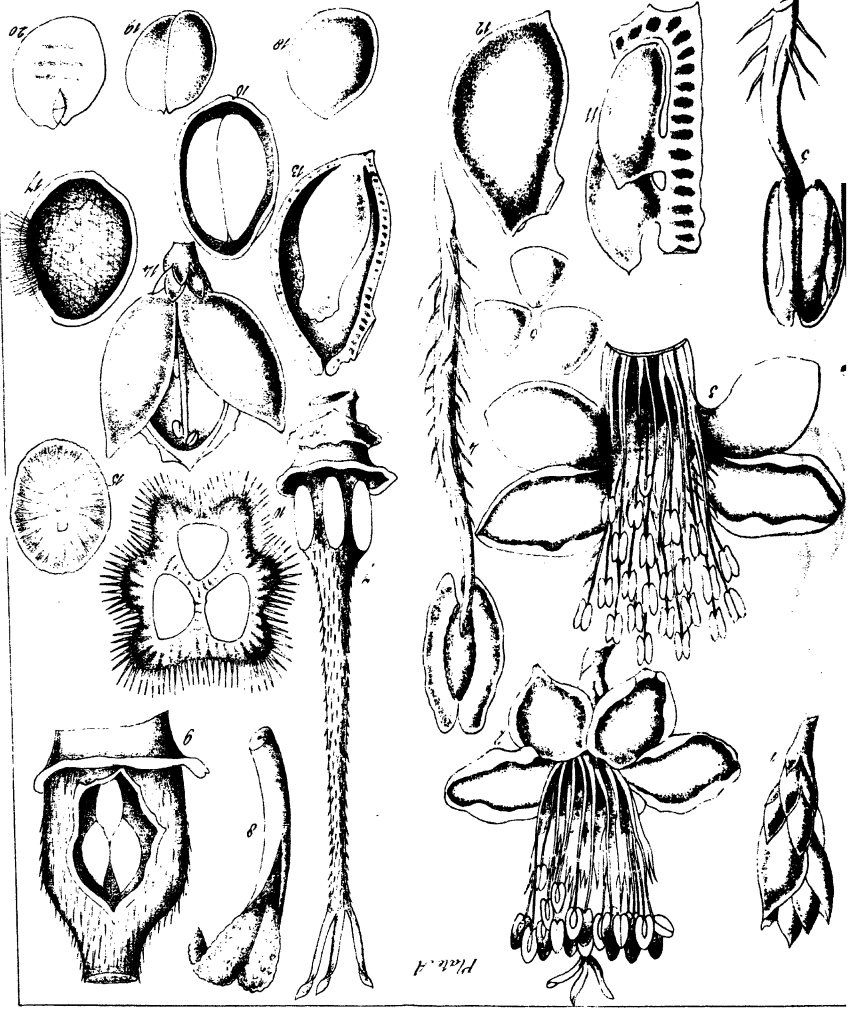
The size of the Tea plant diminishes, speaking in a general point of view, as we proceed towards the west, and speaking in a limited point of view, as we approached the confines of each tract or locality. On this point Mr. McCLELLAND excellently observes, "It was also to be remarked here as well as in other situations in which the Tea plant was afterwards examined, that insulated individuals were smaller in size, the farther they were detached from the natural limits of the colony; which last were always found to be marked by certain changes in the soil, except, perhaps, in a single instance." The largest plants exist in the Kufoo locality, one being observed to measure 43 feet in length, with a diameter near the base of six inches. Occasionally the plant reaches to a height of 47 or 50 feet. The average height of the better sort may be estimated at 6 to 8 feet. At Gubroo, as I have mentioned, it exists only as a moderate sized shrub; it was hence pointed out to us as a new variety, and was even dignified with the name of dwarf Tea. But this diminution in size is not of sufficient importance to characterize a variety, and may always be expected to occur towards the boundary lines of the geographical distribution of every plant. The appearance of the plant, excepting some at Tingrei, where the jungle was less than usually thick, is the same as one would expect in any shrubby plant growing in a dense jungle. This may be characterised by a great tendency to elongation, (each plant struggling as it were, to attain a height at which it may procure some portion of solar influence) by a small straggling crown, and by a general paucity of leaves. During the examinations, ample opportunities occurred of seeing both flowers and ripe fruit, the latter being the remainder of the produce of the last season. There is some variation in the time of

* See Mr. McClelland's Report, p. 12.

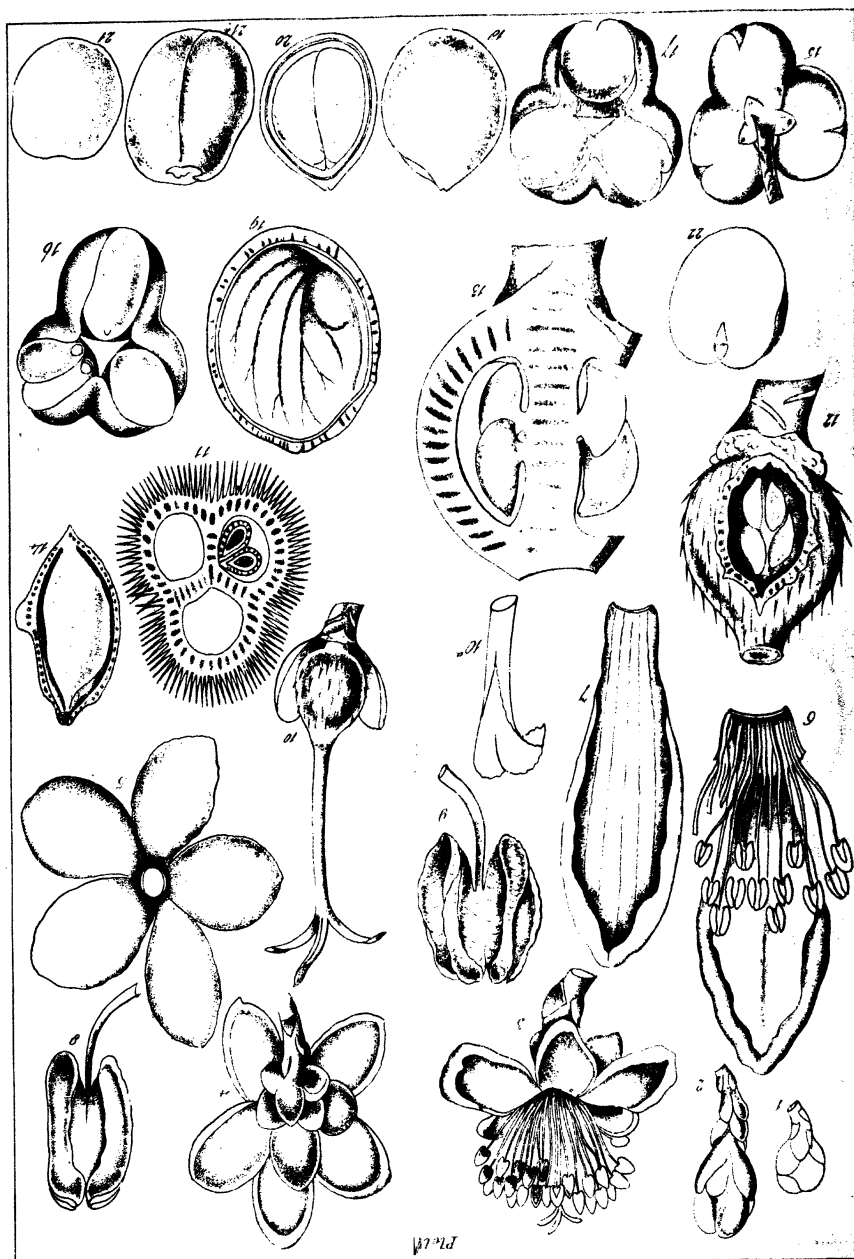
Cantharus sp.



Cantharus Cantharus Wall.



(annella thesora first)



flowering between the extreme localities, as at Kufondoo the plant was in full flower in the middle of December, while at Nadowar it was in flower in February. The leaves of all the plants were old and of a very dark green, they were sufficiently coarse and varied in length from 4 to 8 inches. The young leaves unfold, I believe, about April.

PART II.

Remarks on the Vegetation associated with the Tea Plant in Assam and in China.

The cause that exercises the greatest influence on the distribution of vegetables is known to be temperature, and the causes which exercise the greatest influence on this, are latitude and elevation. The ratio which these bear to each other, has been determined by BARON HAMBOLDT, one degree of retrogressive latitude being near the tropics equivalent to an ascent of 396 feet. It is owing to this law that the line of perpetual snow on the mountain Sulitelma, in Lapland, lat. 68° N. occurs at an elevation of 3,640 feet, and on Chimborasso, one of the Andes, in lat. $2^{\circ} 30'$ S. at one of 15,600. For the same reason in ascending in India an elevation of a given height, the floras of a tropical, sub-tropical, temperate, alpine, and lastly, arctic regions may be passed through in succession, until we arrive at the limits of vegetable existence. The same series may be viewed in succession in passing from the equator towards the poles, until we again reach the limits of vegetable existence. In drawing up an estimate of the comparison between the floras of Assam and of the Tea districts of China, we have but little to do with elevation, that little being about 380* feet in favour of Upper Assam, or in other words, nearly a degree of latitude; so that lat. 28° in Assam will correspond to lat 29° in the Districts alluded to. Ele-

* The Barometer at Tatung, according to Abel, stood at $30^{\circ} 13'$ at Woo-sha-kea at $30^{\circ} 22'$, &c. See Abel's chart of the route on the Yang-tse-kiang.

vation, therefore, not being of sufficient amount to be taken into consideration, we must turn to the temperature of either climate (particularly to the mean summer and mean winter temperatures), to the humidity, and the amount of light. This last not having been noticed, we have only two agents to consider, and these, I trust to shew satisfactorily in a subsequent part of this report, to be of a nearly similar amount in both climates. I have considered it advisable to preface the remarks on the vegetation associated with the Tea in Upper Assam, by the above slight notice of the agents that act most powerfully on the distribution of plants, because a considerable number of forms appear in Assam which are not found on any part of the plains of India, and which indicate a remarkable peculiarity in its climate, and it must constantly be borne in mind, that neither the latitude nor the elevation of any portion of its surface can account for the number of northern or elevational forms found in its flora, for the extreme latitude does not exceed $28^{\circ} 20'$ N. and the extreme elevation cannot, I think, even at the foot of any part of the boundary ranges, exceed 1,000 feet.

In glancing over the vegetation associated with the Tea, I shall confine myself to the notice of such plants as were actually growing either among the Tea or on the limits of the localities; reserving those which struck me as peculiar, and which were found removed from the Tea, to that portion of my report in which I shall enter more fully into the Botany of Upper Assam.

As the general features of the flora of this province are tropical, so are the general features of that portion which occurs associated with the Tea. Thus at Kufoo I found Tropical Rubiaceæ, Acanthaceæ, and Cyrtandraceæ; Myristicæ, Laurinæ and Piperaceæ; *Dillenia Speciosa*, *Leea*, a *Dipterocarpus* and a *Chloranthus*. among Dicotyledonous forms. Of Monocotyledones Tropical Orchideæ, Commelineæ, and Gramineæ, (among which a *Bambusa* was common) and *Roxburgii* occurred. And of Acotyledones, of which Ferns are chiefly deserving of notice, tropical forms of *Lycopodium*, *Polypodium*, among which is *P. arboreum*, *Asplenium* and *Angiopteris crassipes*. A few Jun-

germanniæ and Hepaticæ, but none of remarkable forms were met with. At this locality no peculiar plant of importance was found, if we except a *Castanea*, the distribution of which, however, is wide. At Kufoodoo and at Ningrew similar features present themselves, but at the latter a peculiarity was indicated by the presence of a *Dicksonia* on the limits of the Colony, and of *Chrysobaphus Roxburghii* among the Tea. At Tingrei a very striking instance was observed in the existence of a species of *Stauntonia*; some importance is also to be attached to the presence of a new and remarkable genus, which at present I refer to the natural order Ternstroemiaceæ, and of a new species of *Choripetalum*, with distinctly acid leaves. Lastly, at Nadawar, the principally remarkable associated plant is a species of *Eurya*. An estimate of the value of each of these will be found in a subsequent part of this report.

In drawing a comparison between the Assamese and Chinese forms that exist in association with the Tea plant, it must be observed that the data are excessively meagre; this applies chiefly to those relative to the Flora of the South of China, and is attributable to the loss of Dr. ABEL's collections and Mss. by the wreck of the *Alceste*. But on the subject of paucity of data I shall hereafter have occasion to make a few remarks. We learn from Dr. ABEL, whose account was written from memory, that in lat 30° 13' N., where the Tea plant was first seen, that a few species of oak and some dwarf chestnuts were found. *Nothochlæna piloselloides*, a fern widely distributed over some part of India, was likewise proved to exist. On a subsequent occasion, when the Tea plant was found apparently wild and near no plantation, a Euphorbiaceous plant, *Elæococcus* of Commerson, was seen growing with it. Dr. ABEL informs us that, "the *Pinus Massoniana* of Mr. LAMBERT still continued to be the most general species of fir, but was occasionally mingled with the *Pinus Lanceolata* of the same author." A species of *Eugenia* is likewise mentioned as covering "the declivities of almost every hill in the province of Kiang-see." If we now consider the plant actually mentioned by ABEL as occurring close to the Tea, we shall find

that they are reducible to several species of Oak, among which are *Quercus Densifolia* and *Quercus Sinensis*.

Some Dwarf Chesnuts.

Elæococcus Vernicia (*Dryandra cordata* of ABEL's Journal.)

Pinus Massoniana.

Pinus Lanceolata.*

Mr. ELLIS mentions it as being found associated with a new species of oak, and the *Laurus Camphora* at the foot of the Leshan mountain.

In addition to these that were actually observed, we may infer that it is associated with *Camellia oleifera*, *Stillingia sebifera*, *Nothochlœna piloselloides* and *Eugenia microphylla*.†

The relative value of the above plant, as indications of a cold climate varies very considerably. I shall consider those now which are peculiar to China, leaving the notice of those which have representatives in Assam, until I come to the comparison between the floras of the two countries at about similar latitudes.

Elæococcus Vernicia is a Japan plant, but there is another species which is a native of China and Cochin China. As I find that no other habitat is given to the first species than that of Japan, although the works I have consulted are of a later date than the Journal of ABEL, I conclude that the latter species was mistaken for the former. The order Euphorbiaceæ to which this plant belongs, has almost every variety of geographical distribution;‡ but as in the Western world it is decidedly most numerous towards the equator, and as it is conjectured that the smaller number found in the equatorial regions of the Eastern

* Journal of the proceedings of the late Embassy to China, &c. by H. ELLIS, vol. ii. p. 76.

† There is a curious mistake in ABEL's Journal concerning the etymology of this species.

‡ See LINDLEY's Introduction to the Natural System. Ed. 2, p. 118.

world, is to be attributed to their not having been observed in an equally careful way; we may come to the conclusion that the order is in general an equatorial one. I do not, therefore, attach any importance to the existence of this plant, particularly if it be not the Japan species.

The occurrence of the Tea plant with a decided species of fir, the *Pinus Massoniana* of LAMBERT and SPRENGEL, or *Pinus Chinensis*, has been a matter of surprise to most of the authors who have noticed the Tea, and who have hence inferred that the climate of such places was similar to that in which Fir trees are generally found, that is one of a temperate or subalpine nature. Although the genus *Pinus* is, perhaps, especially if the number of species be considered, a better indicator of a decidedly cold climate than any other in the order, yet exceptions do exist: a species is found in the dry sandy plains of Virginia and Carolina, as well as on the sea shores of the south of Europe. One species, *Pinus halepensis*, derives its name from being found about Aleppo as well as on sea coasts of Southern Europe; it is so impatient of cold, that plants cultivated in England are liable to be destroyed by frosts. *Pinus Canariensis* is found in the Canary Islands from the level of the sea to an altitude of 6700 Parisian feet; this is remarkable not only from the latitude of these islands, but from their insular climate, at least at low altitudes.

In addition to these aberrations, the existence of Pines is by no means dependent on mere elevation in all cases, for although they descend in lat. $30^{\circ} 31' N.$ on the Himalayas to within 2,000 feet of the plains, none exist on the Khasiya Hills until the torrent of the Boga Panee is reached, along the bed of which they occur. Yet the difference of altitude between the summit of this ravine on the Churra side and the bed of the torrent, cannot be less than 1,500 feet. From this place, which may be estimated at about 3,500 feet, above the level of the sea, they ascend to nearly 6,000, the highest point of the range in this direction. They descend on the northern, or Nunklow face, to about 2,500 feet above the plains of Assam, attaining the greatest perfection at about 3,500 feet. What is more remarkable, no Pines exist on

the portions of the same range, which I crossed in my late journey to Hookhoong, although two separate ranges were crossed, one of 5,400, the other of 5,600 feet. Again, on Thumathaya and Laimplangthaya, two mountains well known to the Mishmees, no species of this genus is found, although a few miles farther to the eastward they exist in abundance at similar elevations, and even descend to the bed of the Burrumpootur, along which they were observed by Captain WILCOX.

These facts which may appear foreign to some, I have considered it proper to state, because they indicate that Pines are occasionally more influenced by peculiarity of soil than by mere low temperature, and hence tend to diminish our surprise at the occurrence of a Fir in association with Tea.

The existence of the second species of ABEL, the *Pinus lanceolat*, now the *Cunninghamia Sinensis* of Mr. BROWN, is not of such importance. This species, with some others of other genera, is remarkable for the dilated leaves in opposition to the usual acerose or scaly forms of other Coniferæ. These broad-leaved species are more equatorial, and vary more in their geographical distribution, with the exception of *Salisburia adiantifolia* or *Gingke* of the Japanese, which does not appear to straggle lower than 32° N. L. In proof of this, *Cunninghamia* was first met with by ABEL on his return from Peking, near the Poyang Lake, lat. 30° N. and LOUREIRO informs us, that it is abundant in the southern provinces of China. A *Dacrydium* is found in Penang. The Dammar Pine or *Agathis loranthifolia* is found in the Eastern Archipelago and in Penang *Podocarpus Horsfieldii* occurs also in Penang, and was met with by Captain HANNAY in the third Kioukdweng or defile of the Irawaddi, as far north as 24° 30'.*

Podocarpus neriifolius is found in Nepaul and in Amboyna, and *P. Macrophyllus* in Nepaul and at Singapore.

* Dr. WALLICH is my authority for this.

The remaining species of Coniferæ, which are natives of China, belong to the genus *Thuja* and *Cupressus*, the greater portion being found likewise in Japan. From this we may, perhaps, infer that they are natives of northern China, whence they straggle southwards. ABEL mentions *Thuja* as being abundant in lat. 37° N. and Sir G. STAUNTON does not seem to have noticed it below 32° N. L. LOUREIRO indeed mentions, that two species of *Cupressus* and one of *Thuja* are found in Cochin China, but of these *Thuja* is cultivated.

But regarding these Coniferæ, and especially *Pinus Chinensis*, a question arises; are they not cultivated rather than actually wild, at least in many of the places in which they were observed by the embassies? It must be observed that both firs and oaks are generally mentioned as occurring in plantations, and Sir G. STAUNTON expressly states, "every mountain, either too steep or too rocky to be applied to any other use, is planted to the top in various kinds of pines." If we take into account the industry of the Chinese, and the fact of their applying every available spot to some cultivation or another, this opinion cannot be far from the truth.

PART III.

Comparison between the Flora of Upper Assam and that of China, in somewhat similar latitudes.

The next subject of enquiry is one of considerable extent, and of considerable difficulty, owing to the scanty data of which we are in possession relative to the vegetation of China, as well as for other reasons to which I shall hereafter allude.

For the Chinese portion of the materials I am indebted to the work, already often alluded to, of Sir GEORGE STAUNTON, in which four lists of plants will be found; of these I have restricted myself to the use of the two last, viz. those containing plants found in the provinces of Shan-tung and Kiang-nan, Kiang-see

and Quan-tung. By far the greater portion are taken from LOUREIRO's *Flora Cochinchinensis*, but, unfortunately, as it will be seen hereafter, these are not of much value; the few additional plants are adapted from the lists in ABEL's work and ROYLE's *Illustrations of the Botany of the Himalayas*. I have already alluded to the loss of the whole of ABEL's collections in the *Alceste*, a loss the more to be regretted, as among the few plants he saved, owing to his having previously presented them to Sir G. STAUNTON, were several of great interest. Mr. REEVES, of Canton, has, I believe, considerably extended our knowledge of the Canton Flora, by transmitting plants and seeds to England; but with the actual nature of the results I am unacquainted. The latest traveller to the Tea districts was Mr. GORDON, but his attention does not appear to have been directed (as it might, with justice have been expected to have been,) towards increasing our knowledge of the vegetation of the Chinese Tea districts. A small collection of such plants as strike common observers, is in all such cases of much more importance than is usually imagined; neither does it involve any material degree of trouble or labour.

The materials from which the accounts of the Flora of Upper Assam are deduced, were collected during my residence at Sadiya, from March to October, 1836; they were partly published in a very imperfect form in the *Journal of the Asiatic Society*, for December, 1836; but I have since been enabled to render them a little more complete, by a hasty examination of the collections made during the late deputation, which enclose a few additional plants of interest.

The examination was necessarily hasty, owing to the confusion in which the deputation, Herbarium, which has been kept at the Botanic Gardens, remains even at this remote period.

EXOGENE.

<i>Natural Orders.</i>	<i>Assam.</i>	<i>China.</i>
Ranunculaceæ,	4 15	6 30
Papaveraceæ,	0	1 15

	<i>Assam.</i>				<i>China.</i>			
Nymphaeaceæ,	1				1			
Magnoliaceæ,	3	24			6	40		
Winteraceæ,	0				1	10		
Anonaceæ,	6				3			
Schizandreæ,	1	10			0			
Dilleniaceæ,	2				1			
Umbellifera,	7	15			8	15		
Araliaceæ,	4				4			
Escalloniæ,	0				1			
Ampelideæ,	15				3			
Onagrariæ,	2				4			
Combretaceæ,	3				1			
Alangieæ,	1				1			
Hamamelideæ,	1	10			1	10		
Melastomaceæ,	6	15			4			
Myrtaceæ,	5				8			
Loranthaceæ,	3				0			
Cucurbitaceæ,	12				14			
Homalineeæ,	0				1			
Begoniaceæ,	1				1			
Crucifera,	3	15			9	15		
Capparideæ,	3				2			
Resedaceæ,	0				2	10		
Violaceæ,	1	5			2	10		
Samydeæ,	1				0			
Droseraceæ,	0				1			
Passifloreæ,	3				1	10		
Flacourtiaceæ,	1				1			
Guttifera,	2				0			
Hypericineæ,	2	10			3	15		
Ternstroëmiaceæ,	6	30			4	15		
Sapindaceæ,	4				4			
Aesculaceæ,	1	15			0			
Polygaleæ,	1	8			3	10		
Lineæ,	1	5			0			

	<i>Assam.</i>			<i>China.</i>			
Sterculiaceæ,	4			5			
Malvaceæ,	6			9			
Elæocarpeæ,	1			0			
Dipterocarpeæ,	1			0			
Tiliaceæ,	5			1			
Lythariæ,	3			2	{ including Soneratia		
Meliaceæ,	8			1			
Aurantiaceæ,	7			13			
Rhamneæ,	5	10		4			
Burseraceæ,	0			2			
Euphorbiaceæ,	15			19			
Celastrineæ,	2			1			
Staphyleaceæ,	1	5		1		5	
Malpighiaceæ,	3			1			
Sileneæ,	0			3		20	
Alsineæ,	3	10		1		5	
Tamariscineæ,	1			1			
Illecebreæ,	3			3			
Zygophylleæ,	1			1			
Xanthoxyleæ,	5			4			
Balsamineæ,	5			2			
Oxalideæ,	1			1			
Conariceæ,	1	15		0			
Rosaceæ-Roseæ,	6	28		10		40	
Pomeæ,	0			6		40	
Amygdaleæ,	2	10		5		20	
Leguminosæ,	41			46			
Chrysobalanæ,	1			0			
Saxifrageæ,	0			2		15	
Crassulaceæ,	0			3		20	
Amyrideæ,	0			2			
Anacardiaceæ,	1	10		2			
Cupuliferæ,	5	25		6		25	
Betulaceæ,	1	10		0			
Urticeæ,	42	5		12		5	

	<i>Assam.</i>				<i>China.</i>			
Myricææ,..	1 8	..	..	..	0
Stilagineæ,	0	..	..	..	1
Juglandææ,	1 8	..	..	..	0
Chloranthææ,	1	..	..	..	1
Saururææ,..	1 10	..	..	..	1
Piperacææ,	5	..	..	..	5
Salicineæ,..	1 5	..	..	..	1 5
Santalacææ,	0	..	..	..	1
Elæagneæ,	1	..	..	..	1
Thymelææ,	1 10	..	..	..	3 30
Aquilarinææ,	0	...	...	...	1
Proteacææ,	1	...	...	...	1
Laurinææ,...	6	...	...	...	3
Nepentheæ,	0	..	..	..	1
Aristolochiææ,	2 5	..	..	..	0
Amarantacææ,..	5	..	..	..	10
Chenopodiaceæ,	3	..	..	..	3
Polygoneæ,	12 15	..	..	..	9
Nyctaginææ,	2	..	..	..	2
Menispermææ,..	18	..	..	..	0
Lardizabaleæ,	2 30	..	..	..	1 15
Ericinææ,	0	..	..	..	3 20
Primulacææ,	1 5	..	..	..	1 15
Myrsinææ,...	6	...	...	...	2
Sapotææ,	0	...	...	...	1
Ebenacææ,	1	...	...	...	1
Styracææ,	2	...	...	...	0
Ilicinææ,	0	...	...	..	1 10
Convolvulacææ,...	6	...	...	...	11
Hydroleacææ,	1	...	...	...	1
Lobeliacææ,...	1	...	...	...	1
Campanulacææ,	3 16	...	...	...	2 8
Sphenocleacææ,...	1	...	...	...	1
Cinchonacææ,	35	...	...	...	16
Stellatæ,	1 15	...	...	...	2 15

	<i>Assam.</i>				<i>China.</i>			
Caprifoliaceæ,	2				3			
Compositæ,								
Cichoraceæ, }	4	20			5	25		
Asteraceæ, }	32				36			
Cynaraceæ, }	3	15			4	15		
Dipsacæ,	0				1	15		
Plantagineæ,	1	8			1	8		
Plumbagineæ,	1				1			
Cordiaceæ,	1				1			
Ehretiaceæ,	3				1			
Boragineæ,	3	25			3	30		
Labiataæ,	14				16			
Verbenaceæ,	11				10			
Pedalineæ,	1				1			
Bignoniaceæ,	1				0			
Cyrtandraceæ,	1				1			
Acanthaceæ,	11				4			
Scrophularinæ,	20				25			
Solaneæ,	6				14			} Several cult
Gentianeæ,	2				2	20		
Apocyneæ,	8				3			
Asclepiadeæ,	9				6			
Oleaceæ,	5	15			2	10		
Jasmineæ,	2				2			

Exoogenæ. Gymnospermæ.

Gnetaceæ,	2				0
Cycadeæ,	1				1
Coniferæ,	0				8

Endogenæ.

Scitamineæ,	9				8
Cannææ,	2				3
Musaceæ,	2				5
Amarvllideæ.	2				0 10

	<i>Assam.</i>				<i>China.</i>			
Burmanniaceæ,	0	..	..	..	1			
Taccaceæ,	0	..	..	..	1			
Irideæ,	1	cult	..	..	3	10		
Bromeliaceæ,	1	..	..	..	1			
Hydrocharideæ,	1	..	..	..	1			
Orchideæ,	15	15	..	..	7			
Apostasiæ,	1	..	..	..	0			
Palmæ,	6	..	..	..	4			
Pontederææ,	2	..	..	..	1			
Melanthaceæ,	0	..	..	..	1			
Liliaceæ,	5	20	..	..	13	50		
Commelineæ,	10	...	...	..	4			
Britomææ,	1	5	..	..	1	5		
Alismææ,	1	3	..	..	1	3		
Juncææ,	1	5	..	..	2	5		
Philydreeæ,	0	..	..	..	2			
Smilacææ,	3	..	..	..	3			
Dioscoreaceæ,	3	..	..	..	1			
Pandaneæ,	1	..	..	..	0			
Aroideæ,	5	..	..	..	9			
Acoraceæ,	2	..	..	..	1			
Roxburghiaceæ,	1	..	..	..	1			
Typhaceæ,	1	3	..	..	1	3		
Fluviales,	3	..	..	..	1			
Lemnaceæ,	1	..	..	..	0			
Gramineæ,	37	15	..	..	18			
Cyperaceæ,	28	20	..	..	2			
Ericoulonæ,	1	..	..	..	1			

Acrogens.

Equisetaceæ,	2	5	..	..	2	10
Filices,	34	25	..	..	19	
Lycopodiaceæ,	5	..	..	..	2	
Musci,	19	50	..	..	6	
Hepaticæ,	13	20	..	..	3	10

From the above list which contains 780 species for Assam, and 623 for China, it is at once evident that the chief features of either Flora are Tropical, and that the singularity of either consists in the existence of forms in tolerable frequency, which reasoning on the latitude and small elevation above the sea would never have been expected. The Tropical nature of the floras is particularly indicated by the great excess of Cinchonaceæ over Stelatae by the Tropical nature of the Leguminosæ, and by the excess in favour of Asteraceæ over Cichoraceæ and Cynaraceæ. In forming an opinion relative to the value of the northern or elevational forms appearing in both, considerable difficulties arise from the fact that many of LOUREIRO's species are so imperfectly known as to be ranked amongst the doubtful; and secondly, from the vague nature of the habitats hitherto given in most general Floras hitherto published, in which the habitat of Indian plants is indicated by India Orientalis, &c. the station or locality being totally neglected. But in no work published is this vagueness carried to such an extent as in the catalogue of the plants of the H. E. I. Company's Herbarium by Dr. WALLICH, in the whole of which scarcely a single instance of indication of elevation will be found, although a great portion of the plants were derived from mountainous countries. It is owing to this vagueness in the habitats, that I have purposely omitted adding to the Chinese Catalogue all such plants as have been merely denominated natives of China, which considering that this empire embraces in extent 20 degrees of latitude, is as unsatisfactory as could well be desired.

I now proceed to the estimation of the relative values of the various forms, indicating a decided tendency towards a temperate climate.

Ranunculaceæ.—The preponderance both in number and in value is in favour of China, although of half the species of LOUREIRO scarcely any thing is known. The *Thalictrum*, which is of greater value than of any of the others, is ranked among the "uncertain." Of his genus *Hecatoniæ* there are two species, but they are referred now to *Ranunculus*. The remaining spe-

cies are two of *Clematis*, and one of *Pœonia*, which, however, only occurs cultivated. Several other species of *Clematis* are natives of China, but as they probably belong to its northern Flora, I have purposely omitted them. Of the Assamese species one is the usual Tropical representative, *Naravelia Zeylanica*; the second is a genuine species of *Clematis*; the third is *Ranunculus sceleratus*; the fourth, and that of most value, is a perennial species of the same genus, which appears to be allied to the European *Ranunculus acris*.

Of these *Ranunculus sceleratus* is found in the plains of India during the cold season.

Papaveraceæ.—The occurrence of this order is to be considered as a positive indicator to a great degree. No wild species occurs in any part of India, except at an elevation of at least 5000 feet. In China, LOUREIRO indicates the existence of one species of *Chelidonium*, but it does not seem to have been met with since.

P. somniferum is extensively cultivated throughout Assam; it flowers during the cold season.

Magnoliaceæ.—China possesses several species of this order, five of which are species of *Magnolia*; it is difficult to ascertain, however, whether they are not cultivated in the southern provinces. This genus certainly requires a cool climate, the amount of cold required varying with the species: Assam has, in addition to the *Liriodendron Grandiflora* of Roxburgh, which is a native of the hilly countries, about Sylhet and Chittagong, two other species, both of which are found throughout the eastern parts of Upper Assam. Mr. ROYLE tells us that the *Michelia Champaca* is alone found in the plains of India, so that considerable importance is to be attached to the presence of these *Magnolias* in Assam.

In *Winteraceæ*, Assam is deficient, but a species of *Illicium* has been added lately to the Indian Flora from the Khasiya Hills, on which it is found in shady damp places, at an elevation of 5000 feet. Thus another of the peculiar genera of China, so far

at least as the old world is concerned, is done away with. The Chinese species is the well known *Illicium anisatum*.*

Schizandrea.—The southern parts of China appear to be deficient in this order, which is of positive value; it has representatives in Japan, and probably in the north of China. Of *Sphærostemma* one species occurs in Upper Assam, where it is common enough, particularly to the eastward, along the banks of the Burrumpootur: species occur in Nepaul and on the mountains of Java.

Umbelliferae.—One of the most temperate orders; of 127 species known as forming part of the Indian Flora, only eleven are found on the plains and at the foot of hills, and of these 7 are cultivated. Of the Chinese species nearly half are cultivated, and one belongs to the genus *Hydrocotyle* which is comparatively valueless: to the same genus belong three of the Assamese species; this will leave four to Assam or as many as are found throughout the whole of the plains of India. ROXBURGH mentions two as occurring in Bengal.

To the existence of *Araliaceæ* in any quantities I attach some importance, the bulk of the order in India at least, certainly consisting of hill plants. The number of Assamese species is much underrated.

Onagrarieæ have both tropical and temperate representatives; the latter, however, are deficient in Assam; LOUREIRO's species of *Gaura*, a positive genus, is uncertain.

Hamamelideæ.—The distribution of the species of this small order is so varied, that nothing can be deduced, except that it is an indicator of a temperate climate. The Chinese plant is a species of *Hamamelis* that of Assam of *Sedgwickia*; this has escaped from the Mishmee and Naga Hills, on which it does

* I cannot refrain from mentioning the addition of another genus to our Flora in *Goniocarpus*, Nat. order *Haloragacæ*, hitherto confined to Japan, China, and Australasia. My species is from Churra Punjee, where it frequents road sides.

not ascend higher than 4000 feet. Another Indian species, *Bucklandia populnea*, exists on the Khasiya and Mishmee Hills; it is a positive indicator, scarcely descending below 4000 feet. Of the Chinese *Melastomaceæ* the forms appear to be Tropical, but this is not the case with those of Assam, for at least one species of *Sarcopyramis*, a Nipalese and Khasiya genus, exists: the remaining species are *Oxyspora xagaus*, *Melastoma Malabathricum*, an *Osbeckia* and two *Sonerilæ*.

Cruciferae.—This of which Cress, Mustard, and Cabbage are familiar examples, is one of the most temperate orders. Of upwards of 900 species only 70 have been found in India, and almost all these are from high elevations. Of the 9 Chinese species five belong to genera of universal cultivation; of the remaining 4 one is the Shepherd's Purse, (*Capsella bursa pastoris*,) which according to DE CANDOLLE occurs in India, Japan, Cape of Good Hope, the Mauritius, N. America, and the Straits of Magellan; the remaining three are doubtful. In Assam, in addition to the usually cultivated species, which succeed very well, we have a species of *Nasturtium* or *Sisymbrium*, and one of *Cardamine*, on which last some value is to be placed. Both are however annual.

No *Resedaceæ* occur in Assam: China has two species, of which one is the common Mignonette; the presence of the other which occurs wild, is curious. The general stations of the species are towards the borders of equatorial regions; *Reseda lutea* and *luteola* are the two species which extend farthest north.

Violariæ.—Of this order the genus *Viola* is a positive indicator. Of the two Chinese species one is the familiar violet, *V. odorata*; the other which, I believe, is likewise that of Assam, is *V. Patrinii*; this has a very wide distribution, being found in Siberia, China, (province Kiang-nan) Nepaul, and on the Neilgherries: this same species is also found in the interior parts of Bengal, and was known to Roxburgh as *V. primulifolia*.

Passifloræ.—The genus *Passiflora* which has a wide distribution, is principally American. When it occurs in India, it is as a

positive indicator; to this there is only one exception in the presence of a species at Singapore and Penang. The Chinese species is supposed to be different from *P. cœrulea*, which is a native of the new world. Modecca, in Assam, as well as on the plains of India, supplies the place of the above genus.

Hypericineæ.—With the exception of a species, which, I believe, is *H. japonicum*, and which I have met with in Bengal, and as far south as 12° N. L., *Hypericum* may be considered a good indicator; to it belong both the Chinese and Assamese species. This genus is sure to occur on ascending Hills of any elevation.

Ternstræmiaceæ.—I have already considered this order in my remarks on the genus *Camellia*.

Æsculaceæ.—One of the most positive indicators in the Indian flora, no species having been, until lately, found below 4,500 feet, and *Pavia Indica* not below 8000. Of the former, or *Æsculus Panduana*, nothing is known except that the name, being inappropriate, must be changed. Our Assamese species is sufficiently common about Sadiya, and between that and the Naga Hills on the Hookhoorg face of this range. I have seen it at an altitude of 3000 feet.

Polygalææ.—Of this order the genus *Polygala* is perhaps indicative of elevation or a cool climate: species, however, are met with in situations, which detract considerably from its value. This does not, however, alter the case with regard to the Assamese species, which is a shrubby one, nearly allied to *P. arilata*, a native of the Himalayan and Khasiya ranges.

Salomonieæ, of which one species is found about Canton, is said by Mr. ROYLE to be a genus common and peculiar to China and Nepal: but this is not the case; I am acquainted with 3 or 4 species, of which one is a native of the Khasiya Hills; the remainder are from the Tenasserim coast. Lat. 12° 13' N.

Linææ.—Assam contains one species of *Linum*, and this is, I believe, *Linum trigynum*; the same species is found at the foot of and at a moderate elevation on the Himalayas.

All the *Lythrarieæ* are of tropical forms; those of China include *Sonneratia*, a genus hitherto misplaced in *Myrtaceæ*.

Rhamnææ.—Of this order, of which the maximum number of species is found on the limits of equatorial, and the southern parts of temperate regions, I have only to mention *Hovenia*, originally found by THUNBERG in Japan, subsequently by Dr. WALLICH in Nepaul. In Assam it occurs in the dense and humid Singpho Jungles.

Euphorbiacææ.—All these too are of tropical forms: those of Assam form $\frac{1}{10}$ of the whole flora or rather more than one half less than the proportion for Tropical India: the proportion for China is nearly $\frac{1}{2}$. As I have before said that the order is an equatorial one, and as China with a smaller number of plants has a larger amount of *Euphorbiacææ*, the preponderance is evidently in favour of Assam.

Sileneæ are deficient in Assam. The order, with the exception of a few plants, which appear to have straggled southwards with wheat, &c., is, so far as India is concerned, a positive indicator. Of the Chinese species two belong to *Dianthus*, of which the Pink is a familiar example; of these one is cultivated. This genus is, perhaps, the least positive of the whole order, a great number of species coming from the basin of the Mediterranean. *Lychnis coronata* (the genus is of positive value) is likewise cultivated.

Alsineæ, which are closely allied to *Sileneæ*, are of less value. Of the four Assamese species, one is the common form of *Drymaria*, a genus of wide distribution in India; the second is, I believe, the same as Roxburgh's *Cerastium cordifolium*, found in Bengal during the cold weather; the third (*Stellariæææ*?) is of more value, although it is like the preceding, an annual.

Cerariæææ.—This is a small order, decidedly requiring a cool climate. Only one species has been found in India, *C. Nepalensis*, which inhabits the Himalayan range; the Assamese species, which is not uncommon above Sadiya on the banks of the Burumpooter, as well as along those of the Dihong, is probably identical with that from the Himalayas.

Rosacææ.—Of this extensive family the tribe *Rosææ* is, perhaps,

of the least value. Of this sub-division, the genus *Rosa* is very generally confined to Hills, but one exception, at least, occurs in *Rosa involucrata*, which is found in Eastern Bengal, Assam, and in the Hookhoorg and Magoung valleys, descending even some distance down the Irrawaddi. More frequent exceptions occur in the genus *Rubus*; of this *R. Moluccanus* is a striking example. In China six species of Rose occur, but it is difficult to ascertain precisely what number occurs wild. In Assam, two only are found. The deficiency is partly made up by an excess, so to say, of *Rubi*, of which, in addition to *R. Moluccanus*, not fewer than four occur. Of the two species of *Polentilla*, found in Assam, one is probably *P. denticulosa*, which is, according to Mr. ROYLE, found commonly in the plains during the cold weather, and at elevations of 4000 and 5000 feet on the Himalayas. *Spirœa* is almost invariably a positive indicator; the value, however, of LOUREIRO's species is considerably diminished by its being found also in the Mauritius according to M. SERINGE. *Fragaria Indica*, which according to WALLICH's Catalogue is found in Nepaul Kumoan, and Deyra Dhoon, is of common occurrence in Assam.

In *Amygdalœ*, there is a considerable preponderance in favour of China, but it is probable that most of these species are cultivated. Assam contains two species of *Cerasus*, a genus usually indicative of elevation. Exceptions, however, occur: thus a species exists nearly at the level of the sea as low as 12° N. L. and an *Amygdalus* occurs at Moulmain.

The tribe *Pomœæ*, which is of greater value than either of the two preceding, is, I believe, deficient in Assam: none are indeed, so far as I know, found any where in India until a considerable elevation has been gained. Six species are enumerated by LOUREIRO, of which some are cultivated; but the list might be a good deal increased were I to admit species from the N. of China.

Leguminosæ.—Of this vast order neither China nor Assam possess a single species, occurring naturally, of value as an indicator of low temperature. There is, perhaps, not a single instance of a northern or European form being found in India under

considerable elevations. It is curious, nevertheless, that the proportion of the order in both countries is about the same as that of temperate countries, that is about $\frac{1}{7}$ of the whole or nearly half of the proportion for tropical India, which is $\frac{1}{2}$.

Chrysobalanæ.—This is an equatorial order. I notice it in order to mention the existence of a species in Upper Assam, the fruit of which is very acid, and is eaten in large quantities by the Singphos.

Saxifragæ.—This order, with the exception of *Vahlia*, is a positive indicator, and so is in a particular degree the genus *Saxifraga*. The species, which in India descends lowest, is *S. ligularis*, found in Nepaul, and on the Khasiya Hills at an elevation of 5000 feet. Above this the genus occurs not uncommonly, ascending both in India and elsewhere even to the limits of perpetual snow. The occurrence of a species in China, which is also found in Japan, is remarkable enough, for of 150 species scarcely one instance of irregular distribution occurs. The other Chinese plant of the order is the universally cultivated *Hydrangea*.

Crassulaceæ.—An almost equally curious anomaly exists in the presence of, according to LOUREIRO, *Sedum Anacampseros* and *Stellatum* in China; I cannot, however, find that they have been subsequently noticed. The presence of this genus would, perhaps, be incompatible with that of an excessively damp climate, such in fact, as we have every reason to believe is, that of the central southern districts of China.

Amyrideæ.—This, although a tropical order, presents an instance of irregular distribution in Sabia, which is decidedly elevational. Of four species hitherto detected in India, two are from Nepaul, two from Sylhet; by which, I presume, as usually is the case in the catalogue of the H. E. I. Company's Herbarium, the Khasiya Hills are intended. Its occurrence, therefore, in Assam, in which it is not uncommon, is to be considered as of positive value.

Cupuliferaæ.—This order, to which our oaks, chesnuts, &c., belong, is decidedly one of temperate climates. Still, however,

exceptions to its general distribution are not unfrequent. Among the most striking, I may mention the occurrence of two species of oak at Moulmain, 17° N. L., and of one species of *Castanea* or Chesnut at the level of the sea in the same latitude. Of the Chinese species of the order four are species of *Quercus*, two of *Castanea*, but of these, some are cultivated. Assam contains two species of *Castanea*, and three of oak, one of which appears identical with *Q. lamellata*. Taking the Indian species of both *Castanea* and *Quercus* into account, the value of the latter as an indicator to that of the former is as 3 to 2.

Betulaceæ.—The value of this order is much greater than that of the preceding; it appears to be wanting in China. Of both *Betula* or Beech, and *Alnus* or Alder, the species hitherto detected in India, have been confined to the Hills at considerable elevations. The Assam species is an Alder, and distributed pretty frequently in the more eastern parts of the valley, following generally the course of the rivers. It has evidently escaped from the Mishmee Hills, on which I have seen it ascend to an elevation of 4000 feet.

Urticeæ.—This order is remarkably abundant in Assam, forming $\frac{1}{8}$ of the Flora of the Upper or eastern portion of the valley. The presence of this order in excess is characteristic of a damp, humid, cool climate; it depends upon the configuration of Assam, as the small succulent herbaceous species, which swell up the amount beyond its usual extent, are generally confined to the bases of Hills.

The genus of most value common to both countries is *Morus* or Mulberry; but I must not omit to mention that Assam in addition contains two or three species, which were observed on the Khasiya mountains at considerable elevations.

Myricææ.—The occurrence of this order is of some value, although out of four Indian species two are found at Singapore. So far as I have seen it, or so far as the proper Flora of India is concerned, I should esteem it to be a positive indicator: thus one species exists in Sirmore and Nepal, and one on the Khasiya Hills, both at Churra Ponjee and Nunklow, being apparently

confined to an elevation of between 4000 and 5000 feet. The Assamese species will probably be found identical with this : it occurs in lat. $26^{\circ} 40'$, N. L.

Juglandææ.—This order, which affords the walnut, is represented in Assam by a species of *Engelhardtia*. Of the three Indian species, one is found in Penang and at Singapore, one in Nepaul, and one is common to Nepaul and Sylhet, whence it extends southwards to the Tenasserim coast. It is hence of moderate value as an indicator. The Assamese species appears to be confined to the eastern extremity of the valley, whence it has escaped from the Mishmee Hills, on which I have seen it as high as 3 or 4000 feet.

The existence of *Chloranthææ*, is, perhaps, of negative value ; and yet, so far as my limited experience goes, the presence of *Chloranthus* indicates a humid, rather cool climate. One of the Indian species occurs on the higher parts of the Khasiya mountains; the Assamese species also occurs on this range, but at lower elevations throughout the eastern parts of the valley it is very common. The order is represented in China by a species *Ascarina*, a genus which is also found in the Society Islands.

Saururææ.—The tropical form of this order is *Aponogeton*, which occurs in most parts of India. To the presence of *Houttuynia* in Assam I attach a good deal of value; this genus which is a native of Japan and Cochin China, where, however, it is perhaps cultivated, has been found in Nepaul and in other valleys of the Himalayas, but until lately was not known to exist on the plains. It occurs on the Khasiya Hills, but probably not below 4000 feet.

Salicineæ.—Every body knows how common Willow trees are in northern climates, to which the genus *Salix* is generally confined. The occurrence of a species in Assam, is, however, considerably lessened in value by the existence of a species in Lower Bengal; along the Hooghly a species is even met with in similar situations as far south as 12° N. Latitude.

Thymelææ.—This order is of decidedly positive value, the only exception existing in Cansiera. China possesses three spe-

cies of *Daphne*, (of which one is cultivated) a genus, which in India is only found at considerable elevations. I have not hitherto met with any species below 3000 feet in lat. 26° N.; between 5 or 6000 feet they become more common. The preponderance in favour of China is in this order very considerable, but the deficiency is partly supplied by the occurrence of *Jenkinsia*; this genus is not uncommon from Sadiya eastward, but has not hitherto been found to ascend any of the neighbouring Hills.

Aristolochiæ.—Of the genus *Aristolochia*, which is the only representative of this order in India, certain forms are of considerable value; this applies to one of the species found in Assam, and which I have seen on the Mishmee Hills at a considerable elevation. The other species is, I believe, *A. indica*, which is widely spread over the plains of India.

Polygonææ.—The same may be said of *Polygonææ*, of which the Buck wheat is an example familiar to most people; the case, however, is reversed, for while the majority of *Aristolochias* are from mountainous countries, those of *Polygonum* are from the plains. Some species of this genus are remarkably sure indicators of elevation; one in particular, which has somewhat of the habit of a *Rheum*, appears never to descend below 5000 feet. Of the Assamese species three occur also on the Khasiya Hills at elevations of from 3 to 5000 feet.

Lardizabuleæ.—A small order nearly equally distributed between the new and the old worlds. In this latter the species are confined to Madagascar, China, the Himalayan, and Naga mountains, and Assam. In the Himalayas they are found at elevations of 5 or 6000 feet, even in lat. 31° N. The exact elevation of the Khasiya or Naga species is not ascertained, its habitat being termed Silhet, which according to Dr. WALLICH, includes the range of mountains separating Sylhet from Assam. It will be at once seen of what value the existence of two species in Assam is: one of these is, I believe, identical with *S. latifolia* of the Himalayas.

Ericinææ.—This order which includes the Heaths, *Rhododendrons*, &c., is a positive indicator. I have not seen any species in

lat. 26° 28' N. occurring below 4,500 feet, from this to 10, or 12,000 they increase in frequency. The Chinese plants consist of two species of *Enkianthus*, a genus, I believe, confined to China and Cochin China; and *Azalea Indica*, which last, as its name implies, is said to be likewise a native of the East Indies, but Mr. ROYLE makes no mention of it. The occurrence of such a form in the south of China is, unless it is cultivated, very curious.

Primulaceæ.—This order is certainly indicative of a temperate or even alpine climate. Under certain circumstances, species, even of the alpine genera, descend to within 3000 feet of the plains. No species of *Primula*, or Primrose, is found, however, under 4000 feet; to this genus LOUREIRO refers a Chinese plant, but little is known of it now; and, if it is ever identified, it will probably be referrible to some genus of less value. The *Primulaceæ* of the Khasiya range are, with the exception of one *Primula*, referrible to *Lysimachia*, a genus of considerably less value, in as much as it is at most only a temperate form, and exhibits not unfrequent instances of irregular distribution. The Assamese plant is an annual species of this genus, but like most other instances of Assamese annuals may be met with in flower during the whole year. According to Mr. ROYLE, the only plant of this family found in the plains of India, is the *Anagallis arvensis*.

Ilicineæ.—Of this order the genus *Ilex* or Holly is a positive indicator, and of this the Chinese plant is a species. In India a single species has hitherto been found in Nepaul and Kumaon.

Campanulacæ.—This order is so characteristic of temperate climates, that out of 311 species only 12 are found within the tropics, I suppose at low elevations, for 21 have already been found in the Himalayas. Of the genus *Campanula*, which has three representatives in Assam, only one is found on the plains of India, and of these one is common to the plains and mountains. All the Assamese species are annual; one, *Campanula Dehiscens*, Roxb. which in Assam is principally confined to the banks of the Brahmapootra, has a very wide distribution, being

found along the Jenai, throughout Hookhoong and on the Ir-rawaddy as far South as 24° N. Lat ; towards which point, however, it gradually becomes more and more scarce. The fourth plant is of still greater value; it belongs to a subgenus of *Codonopsis*, and occurs on the Khasiya Hills at an elevation of 4500 feet.

Stellatae.—This order is a temperate one to a peculiar degree. Of the two Indian genera, *Galium* is of the greater value, for of five species, four are from Nepaul, Kumaon, and the Khasiya Hills; the locality of the fifth is not indicated. The genus, so far as I can ascertain, appears to be new to the plains. The Assamese species is not uncommon near the Brahmapoutra in Lat. 26° 40'. Both the Chinese species of this order are imperfectly known.

Caprifoliaceæ.—To the presence of this order great value is to be attached; its existence in India being almost always dependent upon elevation, and that too to a considerable degree. Two of the Chinese species were referred by LOUREIRO to *Lonicera*; one he supposed to be the *L. Periclymenum*, or common honey suckle, but the truth of this is doubted by Rœmer and Schultes; the other LOUREIRO likewise referred to an European species, *L. Xylosteum*, but according to Rœmer it is widely different. The third is *Abelia Chinensis*, of considerable value, if we look at the distribution of the other species, one occurring on the Himalayas at an elevation of 6 or 7000 feet, and one in Japan. A fourth species is reported to exist in China. The Assamese *Caprifoliaceæ* consist of a *Lonicera*, discovered by Captain JENKINS in Lower Assam, a *Viburnum* and a *Sambucus*, probably *S. Ebulus* or the dwarf Elder. Of these the *Viburnum* is of the least value. Towards the foot of the Mishmee Hills, another plant of the order occurs, which I believe will prove to be a new species of *Leycesteria*, a genus hitherto supposed to be confined to the Himalayas, on which in Lat. 30° 31' it is common at elevations of 6 or 7000 feet.

Compositæ.—I have before alluded to the great preponderance of its equatorial forms, which are almost entirely confined to the tribe *Asteraceæ*, over those indicative of temperate cli-

mates, which are included in Cichoraceæ and Cynaraceæ. Of the Cichoraceæ, of which the Lettuce is a familiar example, the representatives in Assam and S. China are nearly the same, belonging to the genera *Lactuca*, *Preranthès*, and *Sonchus*: all the Assamese species are annuals. Of Cynaraceæ, of which the artichoke and the thistle are equally familiar instances, the value is perhaps greater than that of the foregoing tribe. The Assamese species consist of a *Cirsium*, a *Cnicus* and a *Serratula*, this last being confined to the banks of the Brahmapootra. Of the Chinese species I can say nothing owing to the almost indefinite division now being carried on in this vast family.

Dipsaceæ.—This order is, so far as India is concerned, perhaps of maximum value. I have never met with a species under 4000 feet. *Scabiosa Cochinchinensis* of LOUREIRO is scarcely known; this genus is, perhaps, more elevational than *Dipsacus*.

Plantagineæ.—A temperate order and, unless when cultivated, unknown in the plains of India. The Assamese plant is common throughout Upper Assam, and is perhaps the same as the European *Plantago media*. To the same genus belongs LOUREIRO's plant, which he referred to *P. major*, but which is now elevated to the rank of a distinct species.

Boragineæ.—This is one of the decidedly temperate orders. The only equatorial genus of true Boragineæ is *Trichodesma*. From what I have seen of Hill floras, I consider the occurrence of Boragineæ as eminently characteristic of elevation, although *Cynoglossum canescens* is common in the plains of Bengal, and a species of *Lithospermum*, *L. vestitum*, in the arid plains of N. India. The Assamese species are *Cynoglossum canescens*, a species of *Myosotis* and a plant, which I am unable to refer to any known genus, but which approaches to *Anchusa*. Although both these may be considered as genuine elevational forms, we must not forget that both are annual, and that both are confined to the banks of the Brahmapootra. Of LOUREIRO's species which he referred to *Echium*, *Myosotis*, and *Anchusa*, I have not been able to ascertain any thing satisfactory.

Labiatae.—The majority of forms of both countries are equatorial. I have not been able to trace to what genera LOUREIRO's species are now referred. Among those of Assam there is one *Ajuga*, which I have likewise seen at Nunklow on the Khasiya Hills, altitude 4500 feet; a *Plectranthus*, which is found in Nepaul and on the Khasiya Hills at the same place, and a species of *Stachys*. The species of this most difficult order are now in such a revised state, that the old standard works are now no longer of any use in their determination. I cannot, therefore, with my books venture even on an approximation to the value that should be placed on these species.

Gentianeae.—Of this order, famous for its bitter qualities, only certain forms are positive indicators; of such Assam does not contain an instance. Both of its species belong to *Exacum*, a genus of which species are found on the plains of India. The Chinese species were referred by LOUREIRO to *Gentiana*, which is of positive value; (I have not seen any species under 4500 feet). One he supposed to be identical with *G. aquatica*, a native of Siberia, but it is now supposed to be distinct. Of the other nothing is known, except that it differs from the genus in its climbing habit, in which respect it agrees with *Crawfordia*.

Oleinae.—This order to which the olive belongs, has various distribution, yet in my opinion, particularly when there is a plurality of species, it is indicative of a cool climate. The number of Assamese species will have to be increased; at present they consist of two or three *Phillyrea*s, *Chondrospermum smilacifolium*, and an *Olea*. Those of China are a *Ligustrum*, which is of more value than any of the preceding genera, and the well known *Olea fragrans*.

Coniferae.—These have already been sufficiently noticed.

In passing to *Endogeneae* or *Monocotyledones* I shall observe that the occurrence of temperate or Alpine forms under aberrant circumstances in equatorial regions is much more rare than in the preceding grand division of vegetables. In other words irregularities in distribution are much less common. This is perhaps attributable to the greater *polarity* of monocotyledons, their

proportion in the frozen zone being $\frac{1}{3}$, in the temperate $\frac{1}{4}$, in the tropics of the old world $\frac{1}{5}$, of the new world $\frac{1}{6}$. Such being the case, the value of the irregular instances is considerably increased.

Amaryllideæ.—The usual tropical forms of this order are *Crinum*, *Pancratium*, and *Curculigo*. From what I have stated above, LOUREIRO's *Leucoium capitulatum*, will, if ever identified, probably prove to be a species of some less northern form. Two species of *Crinum* compose the *Amaryllideæ* of Assam, but the number will have to be increased.

Irideæ.—Of this order, the flag tribe, which forms such a conspicuous part of ornamental flower gardens in Europe, the great majority are natives of temperate climates. The equatorial genera are *Marica*, *Moræa*, and *Pardanthus*. The few Indian species belong to the genus *Iris*, and all are found at considerable elevations, as in Nepaul, and Kumaon, and other portions of the Himalayan range. The Chinese species consists of a cultivated *Gladiolus*, a species of *Moræa*, and *Pardanthus chinensis*, which is not uncommon in native gardens in Upper Assam.

Orchideæ.—By far the greater number of forms in both Assam and Southern China are equatorial. LOUREIRO mentions a *Neottia* and an *Orchis*, as occurring in China, but I have not ascertained the genera to which his species are now referred. The only northern form occurring in Assam is a *Spiranthes*, a Nepaulese and Khasiya genus; the only elevational form occurs in *Chrysobaphus Roxburghii*, a native of Nepaul and the Khasiya mountains, on which last it is not uncommon at elevations of 3—4,000 feet; this plant is not uncommon in the dense forests of the Singpho districts.

Liliaceæ.—The genuine plants of this order are eminently indicative of low temperature, hence the occurrence of so many in China is remarkable. Of these Chinese plants one is a *Fritillaria*, which in India is an Alpine genus; of this a species occurs at Canton, where, however, it is said to be cultivated. But so strange is this aberration, that I am inclined to believe

with Mr. GAWLER, that the plant in question is an *Uvularia*, a genus of much less Alpine nature. The *Ornithogalum sinense* of LOUREIRO is now supposed to be a species of *Barnardia*, a genus consisting of two species, and confined to Japan and China: the anomaly, if this idea is correct, is hence much lessened. *Ornithogalum* has never, in fact, been found to extend so far eastward, for the *O. indicum* is a doubtful species, and hence it is unknown in the Indian Flora. Of LOUREIRO's three species of Lily, one is cultivated; his *Lilium kamschatense* is supposed to be the same as THUNBERG's *Lilium japonicum*, his *L. pomponicum* is referred to *L. tigrinum* of GAWLER, and his *L. candidum* is considered by some as identical with *L. longiflorum*. But be this as it may, there is no doubt but that his plants are species of *Lilium*, a genus of positive value. Among the other species are two of *Ophiopogon*, of which also a species exists in Assam. The species of *Melanthium* of the same author is now supposed to be a spurious or tropical form of *Anguillaria*, a genus, the genuine species of which are said to be confined to Australia. His remaining species are referrible to equatorial genera, as *Dracæna*, *Sansevieria*, &c. Of *Allium* (or onion) he enumerates 5 cultivated species. The Assamese forms are almost all equatorial, the only exceptions occurring in *Ophiopogon*, to which, however, considerable value is to be attached, as in India it has hitherto, so far as I can ascertain, been found only on the Himalayas; and in the presence of one or two species, which will perhaps be found referrible to *Uvularia*. The peculiarity of the Chinese Flora is well pointed out by these curious irregularities of distribution.

Butomeæ — Of this small order both countries have representatives in the same genus *Butomus*. The Assamese species is the *B. lanceolatus* of Roxburgh, a native of the Toorai, and of the eastern parts of Bengal.

Alismaceæ. — This order has representatives in both floras in *Sagittaria*, the generality of the species of which genus are natives of temperate regions. This is, perhaps, as striking an instance of endogenous irregular distribution as could well be se-

lected. ROXBURGH has enumerated no less than three species as natives of Lower Bengal. The Chinese species is distinct. The same is true but to a smaller extent with *Juncea*, the existence of which is of more value. This genus, in India, is usually confined to some degree of elevation; the Assamese species, which is very common, is an annual. Both the Chinese plants of the order are referrible to the same genus.

Typhaceæ.—This small order, of which the Bulrush is familiar to most people, is almost entirely confined to temperate regions. Both the Chinese and Assamese plants belong to the genus *Typha*; which is the only genus of the order until lately found in India. I have been enabled to add the only other genus *Sparganium*, a species of which I met with in the valley of Hookhoong.

Gramineæ.—The forms in both regions under consideration are mostly tropical; northern forms are characteristic (so far as India is concerned) of elevation to a considerable extent. On the Khasiya Hills very few occur, although between Churra Poonjee and Nunklow an elevation of very nearly 6000 feet is crossed. The common forms on this range are *Andropogoneæ*. Of the Chinese grasses none are of northern forms, excepting some of the *Cerealæ*. In Assam the only valuable form is a species of *Alopecurus*; but it is an annual, and so far as I know, exclusively confined to the banks of the Brahmapootra.

Of *Cyperaceæ*, or the Sedge tribe, the proportion in Assam is the same as that of tropical India, viz. $\frac{1}{5}$. Of this order I shall only notice the genus *Carex*, which although it presents not unfrequent exceptions, is still of much value when a plurality of species occurs. Of 19 Indian species 15 are from considerable elevations; one from the Toorai, one from Penang, one from Rajmahal, and one from the Dindygul Mountains, altitude 2,600 feet. In Assam no less than four species are found, chiefly occurring along the large rivers, Brahmapootra and Dihong.

ACROGENS.

Equisetaceæ.—Of this small order the distribution is varied.

Still there is only one species which, so far as I know, is found on the plains of India. The existence, therefore, of the second species in Assam is of some value; the species alluded to has escaped from the Mishmee Hills, on the water-courses of the lower ranges of which it is alone found. The Chinese species belong to the same genus.

Filices.—Of this order, which is commonly known by the designation of Ferns, the distribution is curious enough. Although in passing from the equator to the poles we shall find them decrease in temperate regions, yet after passing these they increase so much, that at North Cape they arrive at almost their maximum proportional number. In many tropical Islands they abound. In India they are, when in any excess, characteristic of humid climates: they form, putting aside all local considerations, nearly $\frac{1}{10}$ of its Flora; in Assam the proportion is less, being $\frac{1}{15}$. Of those of China none of the forms appear to be of much value, but this is not the case with those of Assam. Thus *Botrychium dancifolium*, a native of Nepaul, Kumaon, and the Mishmee Hills is found in this valley; so is a *Dicksonia*, which is in India to be considered as of some value; this has escaped from the neighbouring Hills, on which, especially the Minaboom range it is very abundant. I have seen it ascend on the Mishmee Hills to an elevation of 4000 feet. Another valuable form exists in the *Polypodium Wallichii*, which has hitherto only been found at considerable elevations on the Khasiya Hills, on which I have seen it as high as 3,500 feet.

Musci.—The order of Mosses is eminently characteristic, when occurring in any numbers, of humidity and coolness. In India scarcely any are to be met with on the plains, but they abound on many of the mountainous ranges. For instance, on the Khasiya range $\frac{1}{3}$ of the whole known number may no doubt be found. Of the Chinese species I can say nothing. The most valuable forms in Assam are two species of *Gymnostomum*, three of *Fissidens*, two of *Orthotrichum*, 1 *Neckera*, 1 *Bartramia* and a species of *Hypnum*, allied to *H. spinivenium*, which I had only previously met with about Churra Poonjee, altitude 4,500 feet.

Of the collections distributed to the scientific world by the munificence of the Honourable East India Company. Mosses, taking 9,000 as the amount of species in the Herbarium, form only $\frac{1}{80}$ of the whole, a miserably small proportion, when the extent of mountainous territory is taken into consideration. Subsequent discoveries will probably raise the proportion to $\frac{1}{30}$ or $\frac{1}{35}$ of the whole Flora of India.

Hepaticæ.—This order is of nearly the same value with the preceding as an indicator of coolness and humidity. In the collections hitherto formed they have, and especially by Dr. WALLICH, been quite neglected; of this Botanist's collections, estimated at the same number as above, they form $\frac{1}{375}$: of the extent to which this small proportion will have to be increased, it will be sufficient to state, that in a few months I have increased it one half, the number of species being now 48, which was formerly 24. The most valuable form is, perhaps, *Marchantia*, a genus hitherto supposed to be confined, at least in India, to the valleys of the Himalayas; a species of this genus, exists likewise in China, where it was found by ABEL, in lat. 24° 25' N.

It may not be amiss here to state the proportions of the grand divisions of Phanerogamous plants presented by the Floras of Assam and Southern China to those of other parts of the globe, as well as of those minor divisions, which have not been noticed in the remarks on the orders themselves. In Assam the proportion of Monocotyledones or Endogenæ, is as 1 to $4\frac{1}{4}$, in China 1 to $5\frac{1}{3}$. The proportion of *Labiata* is about the tropical ratio, viz $\frac{1}{42}$.

Malvaceæ approach rather to the temperate ratio: that of tropical India being $\frac{1}{34}$; of temperate climates $\frac{1}{206}$; of Upper Assam $\frac{1}{72}$.

The Compositæ of Assam have this proportion $\frac{1}{30}$; of China $\frac{1}{3}$; that for India and New Holland being $\frac{1}{8}$.

The Euphorbiacæ of Assam approach in this to some of the proportions found in the Temperate Zone, being $\frac{1}{48}$; that for India and New Holland being $\frac{1}{30}$; that for Sicily $\frac{1}{8}$; for the Balearic Islands, $\frac{1}{3}$.

Amentaceæ, including Betulaceæ and Salicinæ? $1\frac{1}{1}$; that for tropical America being $\frac{1}{80}$.

At some future period I hope to make known still more satisfactory results concerning the Flora of Assam founded on more extensive data. A good deal will, of course, depend upon the strict determination of species, but this is a work of time and requires the enjoyment of an extensive library. A very correct idea of the Flora of Lower Assam might be obtained by the determination of the numerous plants, that have for a considerable time been transmitted by Captain JENKINS to Dr. WALLICH, on which, no doubt, this botanist has been for some time employed.

Avowedly incomplete as my observations given above are, I trust that sufficient has been shewn to prove the singularity of the Flora of Upper Assam, and that in this it approaches to a considerable extent to that of certain portions of China. The singularity alluded to is of such a nature and of such an extent, that I affirm, with tolerable confidence, that it is not to be met with elsewhere in India at the same elevation, even as far north as the thirty-first parallel.

From the amount of the values that I have ventured to give to each plant of northern or elevational form, it will be seen that China at a lower latitude, so far as the generality of the species is concerned, and with a smaller amount of species, has the greater value. But with regard to this I must mention, that in the first place plants from hilly and mountainous regions are included in the list, and in the second place that in almost every case the maximum of value has been given to each such form, which value when the plants shall have been more rigorously determined, will most probably have to suffer a reduction.

It appears to me to be evident enough, that in the Geographical distribution of the component parts of the Flora of valleys, instances of irregularity may be expected to occur. That is, that those plants which flourish under certain elevations may be expected to straggle down towards, or even to reach the bases of the boundary Hills. Certain circumstances are indeed necessary, but then almost all valleys from their configuration enjoy such circumstances: and in Assam they are highly favoura-

ble, for with a mean annual temperature of 67-2, we have a mean summer one of 84, and a mean winter one of 57, and in addition the developement of the heat is gradual. Certain it is, that in Assam most of the forms of value have escaped, if I may use the expression, from the neighbouring Hills. If these views be correct, it follows, that under the same circumstances the narrower the valley the greater will be the number of northern or elevational forms discovered during a progress through it, although the reverse will obviously be the case if a wide and a narrow valley be submitted to complete investigation, because in the former case the boundary Hills being distant, a variation in their Floras may be expected.

I have offered these remarks, not because they bear much on the question as it now stands, but because they will do so if a more extensive comparison be ever made upon good data between the Floras of Upper Assam and of the Tea districts of China.

I have already adverted to the low temperature, during the hot months, of the two great rivers the Dihong and Brahmaputra proper; the influence they exert, is well shewn by the fact, that some of the most valuable forms are confined to their immediate banks. It must be confessed, however, that further inquiries are requisite on this head. I cannot conclude this portion of my report in a better mode than by observing, what is certainly sufficiently remarkable, that of the eight genera, adduced by Mr. ROYLE as proving the similarity of the Flora of the mid region of the Himalayas with that of the mountains of the central provinces of China, five are found in the plains of Assam, viz. *Eurya*, *Stauntonia*, *Kadsura* or *Sphærostemma*, *Hovenia*, and *Ophiopogon*.

PART. IV.

Comparison between the climate of Upper Assam and that of the Tea Provinces of Central China.

The data for forming this comparison are still more imperfect than those for forming a comparison between the Floras of the two countries. The only register, and it is a very imperfect one, relating to the climate of a portion of the Tea districts of China is that of Dr. LYNN, all of Mr. ABEL's having been lost in the *Alceste*. The imperfect knowledge we possess of the climate of Upper Assam is to be attributed to the great scarcity of officers in that direction, until within the last two or three years; and to the same cause is to be attributed the small amount of information we have regarding most other points of importance relative to that quarter. It is, I believe, allowed by all that the principal Tea districts of China are situated between the parallels of 27° and 31° N. Lat. The principal Green Tea district is in Keangnan, between the 30 and 31 parallels; that of Black Tea is in Tokien, between those of 27° and 28° N. L. It is these districts alone that I shall take into consideration; all the observations relative to the excessive climate of Pekin, being foreign to the subject, and only interesting as pointing out the hardy nature of the plant in question, which stretches, it is said, as far north as 31°, and as far south as 10°, at both of which extremes of its geographical distribution, in that quarter, it is said to be cultivated. It grows in great abundance in Cochin China, between the 10 and 16 degrees of north latitude, and its produce would seem to be by no means contemptible. The Tea district of Upper Assam is scarcely a degree of latitude in breadth, and is situated between 26-45 and 27-35 N. Lat., so that in this respect it corresponds to part of the Black Tea district of China. The two most important points, so far as my inquiry is concerned, are the temperature and humidity, and in particular the mean summer and mean winter temperatures. From Dr. LYNN's Register it appears that the range of the thermometer

in the province of Keangnan and the northern extremity of that of Kiangsee, or of a space situated between 28-40 and 30-40 north latitude, was, during the greater portion of November (from the 2nd to the 24th) as follows : —

	Morning.	Noon.
November 2 to 13th	52 63	54 76
13 to 24th	44 62	50 58

It must be remembered, however, that these morning observations were made at various hours, 7, 8, and 9; and that they probably were made on the river Yang-tse-Kiang and on the immense lake Poyang. Throughout the same tract of land I find from the Chart of the route of the Embassy on the Yang-tse-Kiang in ABEL's work, that the range of the observations is from 49° to 63°. Here again the time at which the observations were made does not appear to have been noticed, so that they are comparatively of little value. Throughout the same time the range of the Barometer was from 29° 77' to 30° 27'. The prevailing wind was North East. Some degree of information has been presented to the public concerning the climate of Canton, but by no means so much as might have been expected, considering the period during which Europeans have resided there. The more eastern situation of Canton, however, must be taken into account, owing to the law, ascertained by the illustrious HUMBOLDT, that the eastern sides of continents are the coldest. And it may hence be asked how far will the excess of longitude in favour of Canton over that of the Tea district of Upper Assam, amounting to 17-19 degrees, counterbalance the excess of latitude in favour of the same district in Upper Assam, over that of Canton, amounting to 3° 25', and 4° 20'.

I extract from Mr. ROYLE's work the following table of the means of the several months at Canton, which was furnished by Mr. REEVES to Dr. LINDLEY.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Maxima	74	78	82	86	88	90	94	90	88	85	80	70
Minima	29	38	44	55	64	74	79	75	70	57	40	45
Means	51-5	58	63	70-5	76	82	86-5	82-5	79	71	60	57-5

Mean annual temperature 69-7.

And as a companion to this, I extract from Mr. DAVIS's work on the Chinese corresponding portions of a table, the "Result of Observations made at Canton, during a series of years."*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Mean	57	58	71	76	78	84	88	86	84	76	68	63
Maxima.												
Mean	45	45	60	69	73	79	84	83	79	70	61	52
Minima.												
Means.	51	51-5	65-5	72-5	75-5	81-5	86	84-5	81-5	73	64-5	57-5

Mean Annual temperature 70-4.

Table for Sadiya.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Mean	60-5	61	69	73-5	78-5	83-5	83-5	84	85	80	77	0
Maxima												
Mean	47-5	52-5	56	66-5	70	76-5	76	77	76	69-5	64-5	0
Minima.												
Means.	54	56-7	62-5	70	74-2	80	79-7	80-5	80-5	74-7	70-7	

Mean Annual Temperature 67-2

Taking the means of the tables of Mr. REEVES and of Mr. DAVIS, the mean annual temperature of Canton will be very nearly 70: the mean of the four hottest months in the year 82-2, and of the four coldest months 54.

The mean annual heat of Sadiya, in Upper Assam, will be 67-2.

The mean temperature of the four hottest months will be 80, and of the four coldest months 57-8.

	<i>Canton</i>	<i>Sadiya.</i>
Mean Annual Temperature,	70	67-2
Mean Temperature of 4 hottest months,	82-2	80
—coldest months,	54	57-8

The greatest degree of cold which, so far as I know, has occurred at Sadiya, was in January, 1837, when Major WHITE observed it on one occasion at 6 A. M. to be so low as 32°. On another occasion it fell to 37; 42° is not uncommon. The highest range during the hot months was in 1836, 92°. It is singular that Captain JENKINS had never observed it so high as this at

* DAVIS, Vol. ii. p. 381.

Gowahatti, (90 being its highest range at that place) although considering its latitude and situation, the contrary would be supposed to take place. In Upper Assam January is the coldest month of the year; August and September the hottest and most oppressive.

A glance at the tables will at once convince us of the peculiarly temperate, (speaking comparatively) and, as it were, insular climate of Assam, the extreme difference of the means only amounting to 16·5, while that of Canton amounts to 34·5. I am inclined to attribute this peculiarity in the climate to the early setting in and long continuance of the rains; the first preventing that status, if I may be allowed the expression, between comparatively cool and almost intensely hot weather, which occurs in so many parts of the plains of India; the latter acting in a secondary degree by preventing any great accumulation of heat. It would be useless to attempt drawing an analogy between the Tea districts of China and that of Assam, on the meagre data given by Dr. LYNN, but as it would appear that the excess of cold is in favour of that portion of China in November, and even at Canton during the four cold months, it might be asked to what extent is this counterbalanced by the slow and small development in Assam during the four hot months. I am persuaded, moreover, that the mean monthly temperatures given for Sadiya for January and February are considerably too high.

Connected with the comparative coolness of the summer months, we must not overlook the influence that the low temperature of the vast body of water, drained off by the Burrumpootur, must exert during the period alluded to. The mean temperature of this river is, during the month of September, 65·5 at 6 A. M. and 67 at 2 and 6 P. M., or upwards of 14 degrees below the mean temperature of the air for that month. At the confluence of the two great branches the Dihong and Dibong with the Burrumpootur, the following various temperatures were observed in January last; that of the Burrumpootur or Lohit was 57; that of the Dibong 63; that of the Dihong 51. Of these three rivers the Dihong runs from the place alluded to about W. by North, its point of exit from the Abor Hills being 25 miles dis-

tant in a direct line ; its distance from perpetual snow being probably 80 miles. The Burrumpootur, running nearly due East and West, makes its exit from the Mishmee Hills at a direct distance of 55 miles from the junction of the Dihong, and skirts mountains covered in November with remarkably heavy snow, within an additional distance of 30 miles.

The Dibong running somewhat diagonally through the triangle bounded by the two rivers just mentioned, the base of which is formed by the western and northern portion of the Mishmee Hills, issues from these at about 30 miles from its debouchure into the Dihong. Within 20 miles of the point of exit from the Hills, heavy snow occurs. This river would appear to be more spread out, and less rapid than either of the others ; the land in this direction having a much smaller slope than either parallel to the course of the Dihong or Lohit. Both these have a rapid current: on the former rapids and boulders occur almost close to its point of junction with the Lohit, and on this they are met with about 8 miles above Sadiya. The waters of both have a blueish gray, rather opaque tint, strongly contrasted with the limpid, and, when deep, black waters of the Dibong. Were the volumes of the water discharged by the Dihong and Dibong equal, the cold of the one would be nearly neutralised by the warmth of the other, and the whole body of waters below their confluence with the Lohit would have about the same temperature that this last has at Sadiya. But the discharge by the Dihong is several times in excess over that by the Dibong ; the united waters of the three will hence probably be found to be four or five degrees below those of the Lohit at Sadiya.

The temperature over such a cool and vast body of water must be, particularly during the currents of air which are nearly constant in the direction of the river, much less than elsewhere. The greatest difference I have observed between the temperature of the air over the Burrumpootur and that of a house at Sadiya, has amounted to 20 degrees.*

In October no change takes place in the temperature of the

* Journal of the Asiatic Society for December, 1836, p. 827.

Burrumpootur, but during the cold months it would appear to conform to the usual laws, its temperature being higher than that of the air or in the upper portions of its course, perhaps nearly the same.*

With regard to humidity Assam may be considered as enjoying the maximum. The rains are of long continuance; they commence in March and last till about the middle of October. During May, June, July, August, and September, the fall is steady but not very severe. During March and April the fall is irregular, often accompanied by violent squalls from the S. W. November and January are the only months throughout the year on which tolerable reliance can be placed for a continuance of fine weather, as rain always falls about the middle of December.

The cold weather is characterised by the daily presence of very heavy fogs, which frequently do not begin to clear off before 10 or 11 A. M. The fogs cease to exist on advancing a few miles farther to the eastward; neither do I remember to have met with any on arriving at such a degree of inclination of the surface as to cause the frequent occurrence of rapids. For information respecting the fogs, I must advert to Mr. McCLELLAND's report,† as well as for the effect, that the tendency they have to occupy the south side of the valley, must exert upon the Tea and its distribution. The comparative freedom of the north side of the valley I have often witnessed at Tezpoor, although at the same time the whole southern side was enveloped in a thick and snow-white mist. And with regard to this, Mr. McCLELLAND observes with truth, that "the plains on the northern side of the Brahmapoutra, may, indeed, be considered generally to enjoy two hours more sunshine daily, during the cold season, than those on the south."‡

* See McCLELLAND's Report, p. 41, 42.

† McCLELLAND's Report, p. 41.

‡ In the circular issued by the Tea Committee, I find the following information, which, if correct, proves the great similarity between the two climates. "With respect to the rainy season, it appears to be of much longer duration than in Bengal, if the fall be not so heavy. The rivers in the latitude of

We have scarcely a single direct datum concerning the humidity of the Tea districts of China: we are told that both embassies met with rain on entering the Tea countries, which they both did in November. In Dr. LYNN'S register rain is mentioned as occurring on the 6th, 9th, 15th, 16th, and 20th of November, so that probably the districts alluded to are more subject to rain than even that of Assam. The best indirect proof of the similarity of climate, both as regards temperature and humidity, is to be deduced from the similar configuration of the tracts under consideration. On this subject Mr. McCLELLAND remarks, "if we take Kiang-nan and Kiang-see, as instances of two of the Tea provinces of which we have the best information, we find their resemblance in all great leading features to Assam, very remarkable. Lofty mountains extending parallel to the S. W. and N. E. monsoons, and including extensive low vallies, whose lands are inundated by great rivers are features, common alike to the three provinces."* The same author, after noticing the direction of the mountain chains with regard to the monsoons, the lakes reposing "in vallies scarcely raised above the level of the sea, united by navigable rivers, and surrounded by low alluvial plains subject to inundation, or at most only raised above the influence of ordinary floods;" and the great quantity of water poured out by the Yang-tse-kiang, equal to that poured out by both the Ganges and Brahmapoutra, although its hydrographical basin is scarcely greater than that of either of these rivers, comes to the conclusion that its size, as well as that of the lakes, must be ascribed to "the physical peculiarities of the Tea provinces, and especially to the direction of the mountains in this part of China with regard to the monsoons," and that "we may infer that a most striking similarity exists between that province, (Assam) Kiang-si, and Kiang nan, with reference to humidity."†

the Tea districts are said to be swollen from February till August. An intelligent Chinese, who resides in Calcutta, says it rains heavily in March and April; and again in July and August, and that in those latter months, as much rain falls as during the same period in Bengal."

* Report, p. 44.

† Report, pp. 45, 46.

There does not seem to be much analogy between the climate of Canton and that of Upper Assam, for we learn from Mr. ROYLE's Illustrations, p. 114, that "the cold weather months, or from November to February, are fine, dry, and bracing, with a range of the thermometer from noon to night of 10° and 20', the prevailing winds being N. and N. E. February is cold and rainy; March warm and foggy. In April and May the weather is warm, but pleasant, with variable winds chiefly from the South and South East. In June and July there are often heavy showers, with thunder and lightning."

PART V.

Examination into the nature of the stations of the Tea plant in the province of Kiang-nan and Kiang-see.

Several reasons may be assigned for the origin of the notions, that appear until lately to have universally prevailed, of the Tea plant being a native of, or at least being better adapted to, places of considerable elevation, or of such a nature that snow and frost are of common occurrence in the winter months. But whatever these reasons may be, the merit of having exposed the curious statement made by ABEL, by comparing his account with that of Mr. ELLIS, one of his companions, as well as with that of Sir G. STAUNTON, is due entirely to Mr. McCLELLAND. The principal reason has, perhaps, been the exclusive adoption of ABEL's accounts, on the ground, I imagine, of his having been the only professed naturalist attached to either of the Missions. Mr. McCLELLAND has adverted to the great resemblance that the *Camellia oleifera*, which grows on the sides and very tops of Hills, bears to the Tea plant, and to the fact that the name of the two plants is in the Chinese language the same. To this I have only to add the great difficulty with which, in some instances, the Tea plant, when out of flower, is recognised even by a practised eye.

Guided by the portions of the table report of Mr. McCLELLAND, relative to this point, I have carefully examined all the evidence on which reliance can be placed; and as the subject is

one of considerable importance, in as much as it points out the visionary nature of the views of the aptitude of the Himalayas, &c. for the culture of the Tea plant, I shall detail it at some length. The Tea plant was seen for the first and only time by Lord MACARTNEY's embassy, on their return from Pekin, on the river Chen-taun-kiang, in Lat. 29° 30' N.

We learn from Sir G. STAUNTON,* that "in a short time after the embassy had proceeded on its journey, (after leaving Han-choo-foo), the Hills receded somewhat from the river, which widened, and at the same time became less shallow. The vallies along the river were cultivated chiefly in sugar-canes, then (Nov.) almost ripe, and about 8 feet high." "On the sides and tops of earthen embankments dividing the garden grounds, and groves of oranges, the tea plant was, for the first time, seen growing like a common shrub, scattered carelessly about." It is seldom sown on flat or marshy ground, which is reserved for rice."

BARROW's account of the same tea is as follows:†—"A few miles beyond the city (Hang-choo-foo) we again took shipping on the river Tchong-taung-chiong, which might properly be called an estuary, the tide rising and falling six or seven feet at the place of embarkation, which was not very distant from the yellow sea. After seven days of tedious navigation, if dragging by main strength over a pebbly bottom on which the boats were constantly a-ground and against a rapid stream, could be so called, we came to its source near the city of Tchang-san-chien." "There was no want of trees, among which the most common were the tallow tree and the camphor, cedars, firs, and the tall and majestic arbor vitæ. Groves of oranges, citrons and lemons were abundantly interspersed in the little vales that sloped down to the brink of the river." "The larger plains were planted with the sugar-cane. We had thus far passed through the country without having seen a single plant of the Tea shrub, but here we found it used as a common plant for hedge rows, to divide

* STAUNTON's Account of the Embassy of Lord Macartney, vol. ii. pp. 460, 463, 464.

† BARROW's Travels in China, pp. 529, 530.

the gardens and fruit groves, but not particularly cultivated for its leaves."

Mr. ELLIS, who saw the plant in various states four times, speaks very decidedly of its *station*. In mentioning his ascent to the summit of the range of mountains between the village Talang and Taling-shien, he says, "Our route led us through a valley, where we saw, for the first time, the Tea plant.* It is a beautiful shrub, resembling a myrtle, with a yellow flower extremely fragrant. The plantations here were not of any extent, and were either surrounded by small fields of other cultivation, or placed in detached spots: we also saw the ginger in small patches."

Three days afterwards he again met with it at Woo-sha-kya. "We remained at the island, there being some danger at the point, where Yeang-tse-kiang unites its branches, which it was not thought safe to encounter with so strong a wind. The day was passed in walking round the island, the greater part of which is cultivated with rice, wheat, and vegetables; the cultivation on the opposite bank was cotton, buck-wheat, and beans: one plantation of tea was met with in full flower.† There are evident traces on this island, as on the others, of their being at times inundated, if not wholly submerged." The country on the opposite side is described as a "succession of elevations and hollows, the higher points with clumps of trees." On the third occasion he had ascended the Lee-shan mountain; on his descent he remarks, p. 75, "The large temple at the *foot* of the mountain was out of repair, and only remarkable for the fine trees in the courts;" and at p. 76, "A new species of oak, and several trees of the *Laurus Camphora*, were seen here. The Tea plant was also found, but still in small patches."‡ The fourth station was at Leang-kow. "The wild tea was found here. Mountainous scenery of the same character as yesterday." This is described thus, "ascending the mountains near it (Kwein-ling), the scene

* ELLIS's Journal, vol. ii. pp. 46, 47.

† ELLIS, vol. ii. pp. 51, 50.

‡ ELLIS, vol. ii. pp. 120, 121.

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† ELLIS, vol. ii. pp. 51, 50.

‡ ELLIS, vol. ii. pp. 120, 121.

was remarkable, from the wary appearance assumed by the different Hills, mostly of a conical shape: the valleys were cultivated in 'Terraces.' "All these mountains were in a state of great disintegration: the soil on them is of a deep red colour, produced, as I conceive, from the red sandstone forming their principal component."

Before entering on Dr. ABEL's account, I must mention that he was taken severely ill on the 12th September, and that he went abroad for the first time after his illness at Nan-chang-foo, at which place the embassy arrived on the 23d of November.

The Tea at Patung, which place they reached on the 3rd of November, is thus described:—"The country about Patung was hilly and picturesque." "It was here that some of the trees and shrubs, peculiar to China, were first met with. A small plantation of Tea, from its extent, seeming rather to be cultivated for experiment than for the purpose of manufacturing, was seen on the side of the Hill."*

On the 8th December, he saw it himself for the first time at See-chow. "Here also we gathered the Tea plant, apparently in its native habitat, near no plantation."† Of the two other stations, at which the plant was seen by ELLIS, I can find no mention in ABEL's account, yet he says, while alluding to his illness, "I must be allowed to declare, that all the purposes of my appointment, as naturalist, were largely answered during my illness through the exertion of my friends."‡

The last eye witness of the Tea plant in China was Mr. GORDON. From his account I find that the highest plantations were reckoned to be elevated 700 feet above the plain; that the places selected for the cultivation were generally in the bottoms of Hills, where there was a good deal of shelter on two sides, and the slope comparatively easy.

I have not been able to ascertain the existence of any further evidence that can be depended on. Mr. GORDON transmitted

* ABEL, p. 164. † ABEL, p. 181. ‡ ABEL, p. 142.

from China to the Tea Committee two sets of answers to queries, one of which was obtained by Mr. MORRISON, who, however, states that he will not be answerable for the truth of all the statements. The other was obtained by Mr. DANIELL from a friend who had often been on the spot; to this, no doubt is attached. The substance of the answers of this last set relative to the stations of the plant, are as follows:—The Hills on which the Tea grows are not high; the plantations when the soil is favourable, extend over the whole surface, from the summits to the bases. The difference in temperature from that of the adjacent plains is scarcely perceptible. On the information obtained by Mr. MORRISON, after the doubtful character of the giver, it is not necessary to dilate, particularly as there is, it appears to me, a manifest contradiction, regarding frost and snow; for after saying that frost, unaccompanied by snow, is frequent for eight or ten days together, he states, when asked, at what the frost commences, that “it begins about December, snow about January, and both continue till March.” It must not be forgotten that ONEAS ANDERSON, a livery servant of Lord MACARTNEY, states, that he saw Tea and Rice growing on the banks of the Peihœ. Mr. BARROW refutes this rather indignantly, but a mistake might have arisen owing to the “crude notes” of the person quoted. And although the idea seems absurd of the association of Tea and Rice on the Peihœ in the parallels of 39° 40', it would be by no means so on the banks of the Yeihœ, of which name, or one very closely resembling it, there is a river in China. It must also be remembered, that according to ABEL's chart, rice and millet occur as far north as 38° 30'.

I now come to the circular issued by the Tea Committee. The first statement is, that “of the climate of China generally it may be remarked, that the cold of its winter is far more severe than that experienced under corresponding latitudes in Europe.” This is quite irrelevant and should have been limited to the northernmost parts of China, because the southernmost part of Europe being in the 35th parallel, and the northernmost of China in the 42d; it follows that there are only 7 degrees of latitude common to both countries.

Great part of the paper refers to the northern parts of China, and this I shall pass over as irrelevant. It is stated that DE GUIGNES found the warmth agreeable in Kiang see early in December, and the cold in crossing the mountains in Kiang-nan was sharp. On his return he found the weather in Kiang-nan, in which province he remained till the 23rd March, mild, and the winds variable.*

DU HALDE is said to specify *three* places as particularly famous for their teas

“ Long-lo-shan, a hill in the province of Kiang-nan, Lat. 30° N., neither high nor of great extent, but covered over with these shrubs, which are cultivated on its sides in the same manner as at the foot of the neighbouring mountains.” “ Boy-ee-shan, a hill in the province of Fokein, Lat 27° 40'; Loongan in the province of Kiang-nan. The Tea Hills lie in latitude 31° 50'.” “ The lake I saw adjacent to the city of Len-choo-foo, in the neighbourhood of Loongan, waters the surrounding plains so well, that they produce all sorts of grain and fruit, and especially the best sort of Tea, on which account chiefly the whole district is famous.” This passage is rather obscure. 1st. DU HALDE specifies three places as famous for Tea, whereas there appear to be four. 2nd. Mention is made of Tea Hills, whereas DU HALDE expressly says, plains.

“ Besides these places, P. FONTENOY specifies a plain about 60 miles from the sea, in latitude 31° 40', where the waters abound so as to form several islands, that produce excellent Tea, which is sent even to Peking and all over China.”

The latest writer on the subject of Tea is, I believe, Mr. ROYLE; he has entered into it at length in his illustrations, and his account has been characterised by one of the leading Botanical authorities in England, as most valuable. But with all possible deference to this authority, and to the abilities of Mr. ROYLE, it appears to me that the account is drawn upon preconceived opinions, and he has evidently considered ABEL to be the leading, and, indeed, the only authority. Mr. ROYLE although he quotes the account of Sir G. STAUNTON, who did see the Tea,

* This refers to climate, and should have been placed in part fourth.

has not observed the discrepancy between it and the station on the side of a hill given by ABEL, who had not then seen it. At page 117, Mr. ROYLE thus continues, "few days farther progress brought them to the confines of the province of Keang-see; near this they found the Tea plant cultivated on the hills, which also abounded with oaks and fir-trees; and near the banks of the river there was extensive cultivation of rice, cotton, and bamboos." This passage must refer to one of the stations of the plant seen only by ELLIS, because ABEL only notices the plants as occurring on the 5th of November and on the 8th of December. I refer to the extracts from ELLIS's work for information as to its station on hills or in valleys. It is needless to pursue the subject any farther. If additional proofs are wanting concerning the precise nature of the stations of the Tea plant, I conceive that very satisfactory ones exist in the fact that Mr. MCCLELLAND has pointed out, that the plant was only seen by the embassies while in boats on the rivers and lakes, that none was seen by Lord MACARTNEY's embassy "while crossing the ridge of mountains that separates two of the best Tea provinces, Che-keang and Kiang-see," although the route crossed these Hills in a portion, marked in the general chart of China attached to ABEL's book, as the Green Tea districts; and lastly, that none was found on the Mei-lin mountains which form part of the boundary between the provinces of Kiang-see and Quang-tung.

The cultivation observed in association with the Tea may be considered, particularly in one or two instances, as strongly corroborative of the views of Mr. MCCLELLAND. I allude in particular to that of sugar-cane, oranges and rice, which last can only be cultivated to any great extent on low flat alluvial lands. It must be remarked here that almost all the cultivated plants mentioned in the embassies, as associated with Tea, succeed remarkably well in Assam; in particular, rice, sugar-cane, oranges, buck wheat, beans, cotton, and the ordinary vegetables.

Connected with this branch of the enquiry we must take into account the stations of the Tea plant in Assam, in which province it shews no tendency to variation. Although its occurrence on a low rounded elevation at Gubroo, would seem to in-

dicating a possibility of its being found on the contiguous Naga range, yet neither Mr. McCLELLAND nor myself observed it during the time we passed on the range alluded to; nor did I succeed in tracing its existence on these mountains, farther to the eastward, on which its place may be said to be supplied by another and a very distinct species. Much light may be thrown on this point, namely, its liability to ascend to some elevation, by the examination of the Tea at Borhath, which place, unfortunately, the deputation did not visit.

Further proofs will be adduced from the geographical distribution of the family to which the Tea plant belongs. As an additional proof that the Tea, in its native state, is not found on hills at any great elevation, I may mention that the Tea, which appears, beyond a doubt, to be a native of Muneepore, is confined, so far as is yet known, to low elevations, not exceeding one of 200 feet above the level of the valley. Here, too, it is found to be associated with a reddish soil. For this information I am indebted to Captain PEMBERTON.

After having thus detailed the evidence regarding the stations of the plant, I am at a loss at which to be most surprised, at the bold statement of Dr. ABEL, or at the unlimited confidence placed in them by all subsequent writers except one. Indeed it is difficult to conceive how the statement alluded to, could have been made, for it is diametrically opposed to the relations of Sir G. STAUNTON, Messrs. BARROW and ELLIS. The value of ABEL's account may be at once estimated from the fact that, excepting at Canton, he never saw the Tea plant but once, and then, apparently, wild. And on these extensive data does he found his recommendation of the Cape of Good Hope, for the site of the Tea cultivation.

PART. VI.

Remarks on the genus to which the Tea Plant belongs, with remarks on the geographical distribution of the Indian Plants of the natural order, Ternstrœmiaceæ.

Most botanists appear to have agreed, but on what grounds I know not, that the plant furnishing Tea is generally distinct from Camellia. Without entering minutely into the history of these genera, it will be sufficient for me to state that LINNÆUS, DECANDOLLE, HOOKER, and CAMBESSEDES appear to have no doubt on the above point; and the last author, who has written a monograph of the order Ternstrœmiaceæ, places the two genera at considerable distances from each other. This unnatural separation appears, however, to have partly arisen from the author not having been acquainted with the structure of the seeds of Camellia. In the report of the Tea Committee published in the Journal of the Asiatic Society for the year. 1835, at p. 47, will be found an appendix containing the marks, by which Dr. WALLICH considers the two genera alluded to, to differ very widely. Before analysing these distinguishing marks, it will be necessary to premise a few remarks on the structure of the fruit, by which I mean the Ovarium, in its mature state. A fruit, when simple, consists of a single Carpellum, or modified leaf, rolled inwards, so that the margins meet next the axis: if it be completely normal, it consists of a single cell. Most frequently, however, other Carpella enter into its formation, and their margins being rolled inwards, it follows, that all will meet at or near the axis. The inflected portions, if approximated, as is usually the case, will divide such a fruit into as many cells, as there are component Carpella, and the partitions or septa will necessarily be double, although this cannot always be demonstrated. Of this structure is the fruit of the Tea plant, consisting of three Carpella.

Of the vertical dehiscence of such a fruit there are two principal modifications. If it opens along the line of the inflected

margins, each valve will consist of the original Carpellum, now become distinct, the dissepiments having divided into two plates forming the sides of each valve. This modification constitutes the *Septicidal* dehiscence: it is likewise expressed by some as consisting in the alternation of the valves with the dissepiments, or in the valves having their margins turned inwards. But if the cohesion between the inflected portions be sufficiently strong, (or perhaps from other causes) the dehiscence may take place along the middle of the back of each cell or carpellum, usually indicated by a line known to botanists by the term of dorsal suture: in this case the valves are compound; and the partition will project along the middle of the valve in the form of a keel. This is the *loculicidal* dehiscence, formerly known by the phrase "the dissepiments are opposite the valves." To this modification belongs the dehiscence of the fruit of the Tea plant.

It is now known that no higher value than that of generic importance can be attached to such difference in the dehiscence of fruits.

Let me now apply this to the memorandum alluded to, and in particular to the sketches, for the language is rather obscure. It will be at once seen that the dehiscence is both in *Thea* and *Camellia* of the same nature; that is, *loculicidal*. Having reduced the dehiscence of the two fruits to the same character, the question naturally arises, where is the wide difference? The only difference that does really exist, is simply of specific value, consisting in the fruit of the Tea plant being three lobed, of the *Camellia* triangular. The question appears to me to be reduced to this; Dr. WALLICH either intended to establish that the dehiscence of the one is *septicidal*, of the other *loculicidal*, in which he has certainly failed; or to characterise the one genus as having a three lobed, the other a triangular fruit; a difference which, it is needless to state, cannot be admitted to be of generic value.

I am prepared to state from examination of the Assamese Tea plant, and of two species of *Camellia*, from the Khasiya Hills, that there is no difference between *Thea* and *Camellia*;

and I am not singular in this point; for in Dr. HOOKER's account of the Tea, in the *Botanical Magazine*, new series, t. 3148, I find that some able European botanists are said to be of the same opinion. The name *Thea* should be preferred, owing to its seniority, it having been given by KÆMPFER, in 1712, while *Camellia* was constituted by LINNÆUS, in 1753. For the perfect identity of the Tea plant and *Camellia*, I refer to the attached drawings.

Of the family Ternstrœmiaceæ to which this plant belongs, about 40 species are known to exist in India; these belong to the following genera, their stations being given to illustrate the geographical distribution of the order, and to corroborate the idea that the Tea plant is not found on mountains at any considerable elevations.

Of *Cochlospermum*, one species only exists: it has a wide range, being found on the Coast of Coromandel, in lower Bengal, and in the north of India at Hurdwar; its station is chiefly on low hills.

Of *Ternstrœmia* seven species exist in the catalogue before alluded to, but all are doubtful; their range is from Singapore to Tavoy: one may, perhaps, be inferred to exist in the Peninsula of India, but its station is unknown.

Cleyera. Of this genus there are three species: one from Nepaul, one from the Pundua mountains, by which is meant the Khasiya range, and one from the Peninsula.

Of *Eurya*, seven species exist: they are found equally distributed in the hill and plain Flora of India. One species attains the maximum of elevation, so far as the Indian portion of the order is concerned, being found, according to Mr. ROYLE, in Lat. 30° N., at an elevation of 6,500 feet, among pines, oaks, and rhododendrons. I have found one species at the level of the sea, as low as 12° N. Lat.

Saurauja. Six species exist in the catalogue; of these 5 are from Nepaul and the Khasiya Hills, one from Penang. So far as my experience goes, no species ascends above 4,500 feet in Lat. 27° 28' N. Three species are found in the valley of Assam, having straggled down from the boundary hills.

Gordonia. Of the nine species referred, some will doubt, to this genus, four are found in mountainous countries at elevations of between 3-4,500 feet; the remainder occupy the countries between Chittagong and Singapore. On the Khasiya Hills I have seen species ascend as high as 4,500 feet, in Lat. 25° 40' N.; in Lat 27° 20' this genus ceases at 3,500 feet. Another species is common about Bamo, Lat. 24° 20' on plains, at an elevation of, perhaps, 700 feet above the sea.

Of *Camellia* five species are enumerated in the Catalogue, but two of these are doubtful; of one, leaves* alone existed. The species which ascends the highest, appears to be *C. Kissi*, which is found on the Himalayan range at elevations of 4-6,000 feet.

C. caudata, which on the Khasiya Hills occurs at an elevation of 3-4,500 feet, in Assam, Lat. 28, descends nearly to the plains. A third genuine species occurs on the Naga range, towards the eastern extremity of the valley of As-am, occupying the summits of hills of an elevation of 1,000 to 1,500 feet. This species, which attains the size of a small tree, is well known to the Assamese and Singphos by the name of Bun Fullup or jungle Tea; being used by them as a medicine. The two species that, in India at least, appear to be confined to the plains are the Tea plant, and another which Dr. WALLICH found about Tingrei. Thus of these five ascertained species, three are natives of hills, two of plains. I have elsewhere entered into the question, whether there are two species of *Camellia*, which afford the Tea of commerce or only one; but a few other points bearing on this still remain to be considered. In the size both of the plant and of the leaves, as well as in the texture of these last, and in its stations, the Assamese plant approaches to the Green Tea plant of China; in its geographical distribution, so far as latitude is concerned, it approaches to the Black Tea.

The inflorescence of the Assamese plant varies, but, perhaps, its usual state is to have the flowers solitary in the axils of the

*From such materials was *Camellia*? *Scottiana* Wall. constituted.

leaves. That this is not the natural structure, however, is pointed out by the presence of bracteæ or scales on the pedicells. Hence no specific distinction can be founded on variation in the number of flowers, for each bract should produce from its axil either a flower or a ramification of the inflorescence. In fact, the number of flowers varies in the Assamese plant from one to five. The other differences assigned by Dr. HOOKER, in the *Botanical Magazine*, new series, t. 3148 are not of much importance; the question can, as I have elsewhere said, only be cleared up by a botanist who has seen the plant in its various states in China.

It would appear from the adoption of the term "Colony," as designating the tea patches or localities, as well as from some observations which will be found at page 14 of Mr. McCLELLAND's report, that this gentleman considers it possible that the plant was introduced into Assam.* Now, however, that the plant has been traced to Bamo, nearly a degree and a half farther to the eastward, it appears pretty certain that the Tea has straggled from the East into Assam. The line of continuation between Assam and Bamo is about S. S. E. If the plant had been introduced in remote periods, I should consider that the changes of its successful cultivation would be increased.

Mr. McCLELLAND has observed, that of the Tea localities visited by the deputation, that of Rufoo is the oldest: he also points out the probability of the seeds having been transmitted along the course of currents. With reference to this I may observe, that the courses of the rivers throughout the Tea district are nearly east and west, and that with this the direction of the Tea localities, which is in that of longitude, corresponds almost exactly. Westward of Gubroo, however, the case is dif-

* In the valley of Hookhong Tea appears to be rare, and none certainly exists in any place visited by Captain HANNAY. Among the low undulated hills, separating this valley from the district of Mogoung, two localities occur, of which one is situated on a Nullah, called by the Burmese, the Tea-Tree Nullah. At Bamo it was brought to me from Hills, one day's journey from the town; it is curious that the specimens were certainly superior to any of those from more westerly localities; the leaves being not only smaller, but of a much finer texture.

ferent, for the river Dhunseeree has a northerly course; and not only is this the case, but the distance between the rivers is considerably increased. I consider it, therefore, probable, that Gubroo is really the westerly limit of the distribution of the Tea plant in Assam, and, if this be found not to be the case, that the localities will occur in the direction of latitude and not in that of longitude.

Anneslea. Of this genus only one species exists, occurring on low hills, certainly not 200 feet above the level of the sea, about Moulnain, Lat. 17° N.

Of the last remaining plant of this order, I sent home an account in 1835, under the name of *Erythrochiton*; this occurs on the island of Madamacan, near Mergui, Lat. 12° N. at the level of the sea.

The prevailing station of the order is, in India, on the wooded slopes of hills from the base to an altitude of 6,500, but this degree of elevation is very rare. In Lat. 27° they are most frequent from the bases of hills to an altitude of 2,000 feet. Under certain circumstances the hill species straggle down into the plains.

The Assamese plants of the order consist of two species of *Camellia*, one of *Eurya*, three of *Saurauja*, with the addition of a new genus, which will, I think, prove referrible to the order.

The Chinese plants consist of three species of *Camellia*, of which one is cultivated, and of one *Eurya*. The balance is, therefore, considerably in favour of Assam.

PART. VII.

Remarks on the plans of Tea culture adopted by the Tea Committee, and on a proposed new and improved mode of cultivation.

The prospect of the cultivation of Tea within the vast extent of territory, held by Great Britain in India, cannot have failed to have occurred to the Government at a comparatively early period. Accordingly we find that as early as 1793 Lord MACART-

NEY despatched some plants from China to Bengal, "in some parts of which his Excellency had been informed, were districts adapted for their cultivation."*

From this period until a very late date, when a Committee of Tea culture was instituted, no further steps seem to have been taken. On March 3rd, 1834, a circular was issued by the Committee, calling for information on a considerable number of points, the questions being prefaced by a sketch of the information then possessed by the Committee, regarding the climate and soil most congenial to the Tea plant, as it exists in China. From this document it will be seen, that I have extracted portions, which must generally be allowed to give strong evidence in favour of the correctness of the views entertained of the stations of the plant in the Tea provinces of China, by Mr. McCLELLAND, and which were deduced from a close comparison and analysis of all the data bearing on the point. Yet, in the face of the evidence given in the circular, the questions mostly rest on the idea that the plant is a native of hilly countries, in which snow falls during the cold season. And, in accordance with this idea, the Committee subsequently came to the conclusion, that the requisite considerations are to be met with on the Himalayas, and that Kumaon appears to be the most eligible spot. The following steps were, therefore, put into execution:—Dr. FALCONER was requested to report on the localities, which appeared to him advantageous for Nurseries, and the Secretary to the Tea Committee, Mr. GORDON, was despatched to China to procure seeds and plants for the stocking of the Nurseries. In order to render Mr. GORDON's mission more successful, Dr. WALLICH was requested to draw up instructions, both as to choice of stocks and their transmission, as well as that of seeds, to Bengal. With regard to the first, Dr. WALLICH very properly lays great stress on the care to be exercised in selecting plants and seeds from the very best stocks; and in allusion to the necessity of not selecting any of the plants and seeds, commonly

* STAUNTON, p. 466.

sold at Canton and Macao, he says, "such would be utterly worthless to us, as a common crab or any other raw or wild fruit to any person anxious to plant a garden with the best and most marketable fruit trees."*

With regard to the transmission of plants and seeds to Begnab Mr. GORDON was presented with a copy of an article published by Dr. WALLICH, in the Transactions of the Horticultural Society of London, for 1832, containing the usual routine instructions; now, since the subject has been more maturely considered, entirely superseded. It is strange, however, that no mention of seeds is made, although their transmission, so far as the Tea plant is concerned, is certainly much the more delicate affair of the two. In the course of his missions, Mr. GORDON succeeded in transmitting a great number of seeds to Calcutta, of which one half germinated, a large proportion when the mode of packing is considered. While Mr. GORDON was engaged in China collecting seeds plants, the fact of the existence of the Tea in Upper Assam, and that to a great extent, was brought to the notice of the Tea Committee, who gave information of the fact to Government, in a letter, dated 24th December, 1834.† From this I make the following extract:—"It is proper to observe, that we were not altogether unprepared for this highly interesting event. We were acquainted with the fact, that so far back as 1826, the late ingenious Mr. DAVID SCOTT sent down specimens of the leaves of a shrub, which he insisted upon was a real Tea; and it will be seen from the enclosed reports from the agent to the Governor General on the north eastern frontiers and his assistant, that a similar assertion was strongly urged in regard to the existence of the Tea in Upper Assam." Now, although reasons certainly existed why the alleged Tea might have proved, as the Tea Committee suggested, nothing but a Camellia, yet the very fact of a Camellia being reported to exist, should at once have pointed out the immediate necessity of a proper examination of the

* See Memorandum drawn up by Dr. WALLICH, for the instruction of Mr. GORDON, dated May 18, 1834.

† Journal of Asiatic Society, for 1835. pp. 42. 43.

plant on the spot. And for these two reasons ; first, because it was known in May, 1834,* that the plant in question was used by the Singphos as Tea, and secondly, because it is not certain whether some species of *Camellia*, so called, do not produce Tea. On this point, I quote the following extract from Dr. LINDLEY's Introduction to the Natural Orders :—"The Tea which is so extensively consumed by Europeans, is produced by different species of *Thea* or *Camellia*." The examination which was recommended by Captain JENKINS, on the 7th May, 1834, was recommended by the Tea Committee, in December of the same year, and received immediately the sanction of the Government. On the fact being proved to the satisfaction of the Tea Committee, that the Tea plant really did exist in Assam, Mr. GORDON was directed to suspend all further operations regarding the supplies of Tea seeds, &c., and ordered to proceed to Bengal, unless his meditated excursion to the Green Tea district remained unaccomplished, when a further period of precisely two months was allotted to him. On this subject I cannot refrain from quoting the following extracts from the proceedings of the Tea Committee, on the 2nd February, 1835, and from Dr. WALLICH's accompanying letter to Mr. GORDON :—

"With reference to the communications which the Tea Committee have received about the Upper Assam Tea and its identity with the genuine Tea of China ; considering also, that in all probability the Bohea Tea seeds lately imported from China will not produce that variety here, and that, according to the accounts before the Tea Committee from Captain JENKINS, and Lieut. CHARLTON, the Assam plant exists in sufficient abundance to produce seeds for all the purposes of the Committee, with this great advantage, that they can be procured in a state of perfect freshness ; finally, taking into consideration the great expences necessarily incurred in obtaining supplies of seeds from China, which are now ascertained to be no longer required." Here follows the determination of recalling Mr. GORDON. The extracts

* See extract of a private letter from Captain JENKINS to G. J. GORDON, Esq. dated 19th May, 1834. *Journal of Asiatic Society*, loc. cit.

from Dr. WALLICH's letter* run thus:—"The Committee have maturely weighed the subject of the new discovery in Upper Assam in all its bearings. The genuine Tea grows there, or an indigenous plant which may be cultivated to any extent. There is no ground for supposing that the various sorts of Tea seeds imported from China, will produce any thing but the shrub in its natural state, retaining nothing of the variety whose name the seeds bear; it is, therefore, useless and unnecessary to import from China, at a great expense and great risk, what may be had, as it were, on the spot, to any extent almost, in point of quantity, and in a state of perfect freshness and strength for vegetating. Your continuance in China, so far as regards supplies of seeds, is, therefore, useless and unnecessary."

"The Assam discovery has placed the labours of the Committee on quite a different footing, from that on which they commenced. Who can say what may be the effect of that truly magnificent discovery? The question is now no longer whether the Tea will grow in Hindustan, or whether it produces leaves fit for use, (the Assamese and their neighbours, not to mention the Yunanese consume vast quantities of them) scarcely whether or not the leaf admit of being prepared in the same manner as is done in China for infusion, but simply whether the shrub can be extensively cultivated for commercial purposes, and whether it admits of being introduced in Kumaon, Sirmore, and the like N. W. parts of the country; for the Committee have not had cause to alter their views, in respect to the capabilities of other places since you left us." From the above extract two circumstances of sufficient importance may be deduced. Of these the first is, that had the attention of the Committee been directed *ab origine* towards the place where the plant was reported to grow, there would have been no occasion for the importation of seeds from China, and thus large sums of money would have been saved to the Government. The second involves considerations known only to those who have some acquaintance with the

* Dated February 3, 1837.

higher branches of Botany. The statement made on the above extracts, that in all probability the Bohea Tea seeds lately imported from China will not produce that variety here, "and the same repeated in the letter of Dr. WALLICH," there is no ground for supposing that the various sorts of Tea seeds imported from China will produce any thing but the shrub in its natural state, retaining nothing of the variety of whose name the seeds bear," are grounded, no doubt, on the idea that seeds propagate the species, and buds the individual. It is to a certain extent, perhaps, true, and although a gardener planting the seeds of an excellent apple would not expect that all the plants springing from such seeds would inherit the excellencies of that, from which the seeds are taken, yet I presume he would not prefer taking seeds from a wild crab apple, or hope by so doing for equal success. I may be allowed here to quote the words of the leading authority in England, as bearing on this point. "In sowing seeds for the purpose of procuring improved varieties, care should be had, not only that the seeds be taken from the finest existing kinds; but also that the most handsome, the largest and the most perfectly ripened specimens should be those that supply the seed. A seedling plant will always partake, more or less, of the character of its parent, the qualities of which are concentrated in the embryo when it has arrived at full maturity."* Nor can I reconcile the extracts alluded to, with the memorandum of instructions furnished by Dr. WALLICH to Mr. GORDON, in which so much stress is laid on ascertaining the excellence of the stock from which both plants and seeds are to be obtained.

It may be further submitted, how does the argument, at least now that the nature of the Assamese product is known, agree with the acknowledged fact, that the propagation of the Tea plant in China is almost entirely carried on by seeds. I take it for granted that the Tea of China is superior to that of Assam; but as that Tea is the produce of seedlings which, it is said, only inherit the properties of the shrub in its natural state, it follows

* LINDLEY's Introduction to the Guide to the Orchard and Kitchen Garden, p. 1.

that the Tea plant of China is naturally possessed of higher properties than that of Assam. Against this the nature of the soil of the Tea district of China, &c., may possibly be urged; but in the present state of our knowledge, nothing can be adduced to support the natural superiority of China, in any one qualification for producing Tea, over the province of Assam. It is on this question that the whole system rests; if the statement be sound, then, indeed, the present plan of culture will answer, and some slight modifications will alone be required. But I have no hesitation in saying, that it is contrary to the experience of Horticulturists in all ages. If the Tea plant be a tree species, it will continue to produce its like from seed; if it be a variety only, the seedlings may be inferior, or they may be superior to the parent plant. Dr. WALLICH's statement is abundantly disproved by the very genus in question; all the beautiful varieties of *Camellia* having been raised from seed of the plants raised from the seeds sent by Mr. GORDON: about half were sent into the Hills, a few to Mysore, on the recommendation, I believe, of Col. MORRISON, the remainder to Assam. These last when seen by the deputation in February, 1835, were diminished to about 12,000,* so that the alleged invigorating influence of the Assamese or congenial atmosphere, must have been transitory. By far the greater number had been packed in boxes, a few in large earthen pots or gomla's. The difference in the state of the contents of the boxes and gomla's was immense; the few living plants in the boxes were decidedly, unhealthy; in the gomla's they were perfectly healthy, and so thick that the hand could not

* The distribution of the plants was as follows :—

Assam,	20,000
Kumaon, and its neighbourhood,	20,000
Madras Presidency,	2,000
	<hr/>
	42,000

Of the Kumaon plants I have no intelligence; some report on their present state would be interesting. The accounts of those sent to Madras are satisfactory.

have been thrust between them. This great excess in favour of the pots, naturally leads us to the consideration of the cause of the difference. The largest portions of the Tea seeds procured by Mr. GORDON, in China, were sown in the earth at the Botanic Gardens; when the plants were a few inches high they were transplanted into boxes, and flower pots; a few were sown in gomlahs and not transplanted; and lastly, a few were planted in gomlahs.

The sowing the seeds of woody plants in the earth and then transplanting into pots or boxes, is contrary to the practice of all experienced Nurserymen in England, except when stunted specimens of large growing trees are required. Had the seeds been sown at the first in gomlahs or in boxes, there is little doubt but that they would have reached Assam in flourishing condition. Plants extract nourishment from the soil by means of the spongioles of their roots, which spongioles are situated at the extremities of the roots. The Tea seedling in its first stage produces a long perpendicular root, two or three times the length of the stem, so that when the young plants are three inches above the ground, their roots are probably 6 or 8 inches deep, having very few, if any, lateral fibres; in this stage it is very difficult to transplant them, without destroying the spongioles, and the plants are not sufficiently strong to produce new ones before the top withers for want of nourishment. This in part accounts for the plants in gomlahs having borne the journey better than those in boxes; but it appears that those transplanted into gomlahs still looked much better than those in the boxes. This is easily accounted for; earthen vessels are better suited to the growth of plants than wooden ones, and especially so during heavy rains; the superfluous water is carried off with much more facility, and the plants are kept constantly moist, but do not remain saturated: in large boxes there is a large quantity of earth which holds a large quantity of water, and the sides of the boxes become sodden and the plants rot. But this is not all; as many seeds were sent to the hills, to be there planted, why was not the same plan carried into execution with regard to Assam?

Let me still further trace the progress of these unfortunate plants. A spot was fixed upon (as a nursery) by the deputation at Chykwa,* appearing to possess the requisite peculiarities of soil and situation. The spot completely cleared for the reception of the plants, and after a considerable time had elapsed, owing to the difficulty of procuring labourers, they were at length, under the superintendence of Mr. BRUCE and of a malee from the Botanic Gardens, removed to their final destination. About August I visited the Nursery with Lieut. MILLAR, commanding at Sadiya, and Mr. BRUCE. To my great astonishment not 500 of the plants were alive, and of these almost all appeared in the last stage of decline. The ground was literally matted down with low tenacious weeds, and it is a fact, that on our arrival at the Nursery, not a Tea plant could be seen, owing to the uniform green colour of the surface. I look upon this Nursery, which would, under other circumstances, have contained many thousands of excellent Chinese stock, to the existence of which, I at least, attach primary importance, as totally destroyed. The cause of this destruction is beyond doubt to be attributed to the facts, that the plants, which had for several months been under sheds, were in the Nursery completely unsheltered from a sufficiently hot sun, the obvious remedy for which would have been the erection of temporary muchows or mats, by the removal of which, at certain times, the plants might have become accustomed to that which was to them an excess of solar influence; and that the intervals between the plants, as well as round each, had apparently never been subjected to the operations of a hoe or any other instrument.

Having now sketched the fate of the Nursery for Chinese plants, I am naturally led to those of the indigenous plants. The original Nursery at Sadiya was in Captain CHARLTON'S compound, but as a very eligible spot was selected by Mr. McCLELLAND, behind that of Mr. BRUCE, the plants were subsequently re-

* Chykwa is a straggling place of some extent, a few miles below Sadiya, and on the south and left bank of the river.

moved thither, together with some plants of Mr. BRUCE: seeds of indigenous stock were likewise sown. From these shrubs the first ever made by Chinese in British India was procured, and although the supply was small, yet I am not aware of its having been proved inferior to any subsequently manufactured. The process was seen by no one but Mr. BRUCE, and appeared to have been kept a complete secret from every one at Sadiya. This nursery I certainly considered to be thriving, and although considerable expence had been incurred in its formation, and although the Chinese reside at Sadiya, it is now, I believe, abolished, and no theatre of operations for the Chinese now exists near their head quarters. Let me now turn to the system of operations carried on in the Tea localities themselves. But as neither Mr. McCLELLAND, nor myself were ever consulted on this point, I shall confine myself to those put into execution by Mr. BRUCE. Orders were first issued to the chiefs of the different districts in which the Tea grew for clearing the jungle, and Mr. BRUCE proceeded himself to the various spots to see his orders commenced upon. But as this occurred during the rainy season, Mr. BRUCE was necessarily unable with any degree of safety to protract his stay and to see his orders efficiently executed. To shew the difficulty of working with such tools as the Singphos, I may mention that on my return from the Mishmee Hills in December, 1836, the Tea locality at Kufoo remained untouched. The first place, which was, I believe, cleared to any extent, was the Tingrei locality, and to this place I proceeded from Kufoodoo, that part of the locality, which I have mentioned before as having been cleared, was now quite clean; and the first appearance was certainly satisfactory. The shoots, which had been given off from the stumps were numerous, giving to the plant a bushy appearance. But this was counteracted by a most palpable coarseness in the texture of the leaves, and was accompanied by an unhealthy yellow tint. The appearance in fact was such as to call for exclamations of surprise both from Major WHITE and Lieut. BIGGE, who had previously seen the Tea at Gubroo. The flowers were moreover totally destitute of odour. Of the other and more extensive portion great

parts exhibited a scene of considerable confusion; almost all the Tea plants had been cut down; the underwood was cleared away, and all the forest trees either felled or in process of being so, the debris were being burnt on the spot among the still living bases of the Tea plants!

The only other Tea I saw after cultivation had been commenced was at Kufoodoo; and as here the plan was rational, consisting in partial clearing of the larger and total of the smaller trees, so the plants had a much better appearance than those before alluded to.

Before entering on the plan which I consider the only one for insuring success, I have to consider the question whether the green and black Teas of commerce are the produce of the same species, modified by culture, soil, and mode of preparation, or whether they are the produce of two distinct species. The question has been much controverted, and must be considered even now as being far from settled. Connected with the Tea cultivation in Upper Assam it is of considerable importance, as the Chinese cultivators hitherto imported can only prepare black Teas. Indeed this reason has been assigned for the inferior nature of the Tea hitherto manufactured in that quarter.

The Tea Committee in the correspondence with Government before alluded to, make use of the following decided remark with reference to the Assam Tea plant; "not only is it a genuine Tea, but that no doubt can be entertained of its being the identical Tea of China, which is the exclusive source of all the varieties and shades of the Tea of commerce." And perhaps the generality of systematic Botanists entertain the same opinion. LINNÆUS however appears to have considered that these Teas were produced by two distinct species. In this he has been followed by Sir W. J. HOOKER and Messrs. LODDIGES, by which last botanists both the species have been figured. But it is not from Botanists in England that we must expect the solution of the question: and as no scientific person has as yet seen it sufficiently often in China, we must be content with leaving the question in statu quo. It must be here understood that I attach

no importance to the opinions of ABEL with regard to the specific differences of the plants affording the two Teas. The fact is, the question, like all those involving the differences of plants that have been cultivated from time immemorial, is one of extreme difficulty and will only be solved by long and patient study of the plants under very various circumstances. Not less conflicting are the statements made by persons resident at Canton, as to whether the same plant will produce either green or black Teas. ABEL was led to suppose that such could be the case, but that the "broad thin leaved plant is preferred for making the green Tea,"* and this statement is corroborated by that of a Chinaman, "who had been eight times in the Bohea country, remaining there from four to six months each time, and who stated that Bohea may be cured as Hyson and Hyson as Bohea."† Mr. REEVES, who is well known to some distinguished botanists in England as having turned his attention in some degree to scientific objects, expresses his astonishment at the two Teas ever having been confounded, and that the difference in color between the two infusions is alone sufficient to do away with the supposition that they are the produce of the same plant, differing only in the mode of curing. Mr. MILLETT,‡ who in 1827 held a high official appointment in the Honourable Company's Factory at Canton, is of a different opinion. He says that there are two kinds of plants, of which one has a leaf of a much darker green than the other; and that this difference, may be partly attributable to cultivation, "but it is to the various modes of preparation that the green and black Teas (as they are called in England) of the shops are due."§ Mr. REEVES explains the contradiction of the various statements thus: "There is a species of Tea grown in the province of Canton of a pale coloured leaf (occasionally mixed with Congou Tea to make the Tea imported under the name of Bohea) and this Tea can be coloured and

* ABEL's Journey, p. 222.

† ROYLE's Illustration, p. 111.

‡ ROYLE's Illustration, p. 110.

§ Bot. Mag. New Series, t. 3148.

made up to imitate various qualities of green Tea, and large quantities are yearly thus made ; but still it is only an appearance that can be given”* Information of a similar nature as that of Mr. MILLETT is given in a decisive tone by Mr. DAVIS in his account of the Chinese ; so that the balance is certainly in favour of the opinion adopted, perhaps rather too hastily, by the Tea Committee. Farther proof may be inferred from the fact, that a system of artificial colouring appears to enter into the composition of all the green Teas for exportation, and these again, it is averred, are never used by the Chinese.† Although I have been obliged to leave the question unsettled, enough has been said to show that the inferiority of the Assam Tea is not entirely owing to its being, as has been said, green Tea prepared in the black method.

The discovery of the Tea within the British dominions in India, has excited more speculation among scientific men on the Continent, than in England itself ! M. ALPHONSE DE CANDOLLE, the distinguished son of a most distinguished father, has published an article on it in the *Bibliothèque Universelle de Genève*, for June, 1835—and from this an extract has been made in the *Annales des Sciences Naturelles*, for February, 1836. M. A. DE CANDOLLE, judging from the fact, that the Burmese make no use of any other Tea for infusion,‡ but that which is imported overland by the Chinese, contenting themselves with eating the Tea of part of their own frontiers manufactured into a pickle, concludes that the Assamese Tea will prove but of inferior quality, being the same with that, which I have said the Burmese use as pickle. He says, “ *Le Thé sauvage pourrait bien donner une saveur plus forte, plus âcre, et un parfum peu délicat. Cette considération cependant ne diminue pas, à nos yeux, l'intérêt de la découverte des Anglais. Si la province d' Assam, qui touche à la Chine, présente le Thé spontané, elle doit être éminemment propre à la culture de cet ar-*

* ROYLE'S Illustration, p. 111.

† DAVIS'S Account, vol. ii. pp. 351, 468.

‡ For this he gives Mr. CRAWFORD as his authority.

buste. En supposant que la plante sauvage soit d'une faible ressource, la plante cultivée, celle surtout que l'on ferait venir de Chine, pourrait être fort avantageuse."*

I now come to the consideration of the steps, which in my opinion must be followed, if any degree of success is to be expected. Of these the most important is the importation of Chinese seeds of unexceptionable quality, and of small numbers of the finest sorts of Tea plants. I imagine, and I think that most persons will agree with me, that the importation of even the inferior kinds would be more likely to lead to the produce of a marketable article, than the cultivation of a wild or, to use to our Indian notions a more expressive term, Jungly stock. The evidence I have before adduced relative to the facts of seeds possessing or not possessing most of the properties of the parent, is, I trust, sufficient to shew, that instead of orders being sent for the recall of Mr. Gordon, that gentleman should have been directed to redouble his exertions in procuring additional seeds and plants. The discovery of the Tea plants in Assam I take to be important on two heads: 1st. The fact of its occurring as denizen to a considerable extent of certain portions of the wooded tracts, argues volumes in favour of those tracts being the best adapted for its cultivation. 2nd. From the fact that a wild stock is, under certain management, to which I shall have occasion hereafter to allude, reclaimable to a greater or less extent. On both these grounds the most, indeed thoroughly, philosophical course, that remained was to cultivate, *in primis*, on the tracts alluded to, the best procurable plant, taking at the same time every precaution towards reclaiming the Assam plant. These same remarks apply to a considerable extent to the nurseries in other parts of British India, unless, indeed, the usual qualities of a jungle stock are expected to be reclaimable by the soils of the Himalaya range. From what I have said it will, I think, appear that the prospect of immediate competition with China was quite

* The geographical part of this article is very incorrect, owing probably, to the limited means of consultation on such a point in the possession of the author.

visionary. The first step must be therefore the importation of seeds with a small proportion of the best plant from China; this is still more essential from the total annihilation of those previously imported; and the importation must continue to be for some years, for obvious reasons, an annual one. The seeds and plants are to be planted in the Tea localities themselves, and when these are stocked, in such other situations as may be deemed most eligible.* The living plants that are procured must be brought round and sent up in earthen pots; and the choppers of the boat must be so constructed as to admit of being removed whenever it may be deemed necessary. As I have said the number of plants may be limited, their transmission will not involve a large outlay of money. It should be so managed that they shall arrive in Bengal at the commencement of the cold season. Having located a certain number of good Chinese stocks, and it is with this view alone that I recommend the importation of plants, owing to the greater certainty of success, experiments may be made in crossing, that is by applying the fertilising power or pollen of one to the stigmata or communicating organs of fecundation of another: and, as according to the law that the produce of such fecundation possesses the properties of the plant furnishing the pollen, it is obvious that the pollen of the Chinese plants must be applied to the stigmata of those of Assam. By repeating the experiments indefinitely, always applying good pollen from Chinese plants to the plants produced by previous crosses, it may be expected that the indigenous plant of Assam will lose most or all of those bad qualities that may, with reason, be supposed to exist in it. I need not enlarge farther upon this subject which is one of great extent, and the operation of which requires in an especial degree care: it is one however of every day application in countries where Horticulture is properly attended to. The only circumstance that can retard the improvement of the Assamese plants under such circumstances is the existence of a deteriorating quality in the soil,

* If it be deemed advisable that the seeds be sown in Calcutta, they are to be sown in gomlahs, and on no account are they to be transplanted.

and this there are no grounds for supposing to be the case ; even if it be so, the necessity for the experiment is still farther increased. There are other methods of improving or rather reclaiming plants, on which as they are obvious to every body acquainted with Horticulture, I need not dwell. I allude to grafting, &c. &c.*

The fact that wild stocks are more or less irreclaimable, leads me to state, that all the accounts I was enabled, through Mr. BAYFIELD, to gather, induce me to suppose, that the Tea possesses the last bad quality in a considerable degree. All the Chinese or rather Shan-Chinese, agreed in saying that the wild plant was not considered worthy of being submitted to cultivation ; and I must not omit to mention that the Tea of the Pollong district of Burma, situated to the N. E. of Ava, and which is said to be from the wild stock, has not hitherto, although cultivated to a certain degree from a remote period, undergone any improvement. The step next in importance is to secure a sufficient number of first rate Chinese cultivators and manufacturers, both of black and green Teas. This can only be done by the usual route ; for I found that among all the so called Chinese, who are to be met with at Mogoung, Bamo, and Ava, as well as among those who form the large annual caravans that trade with Burma, there is not a single genuine Chinaman.

From the remarks I have made as to the importance of improving the Asamese plant, it will be evident that certain qualifications are necessary in the person who has the general superintendence of the whole plan. It has been generally allowed that the superintendence of the culture of any given plant requires at the least a certain degree of practical knowledge ; and that if this be combined with some theoretical knowledge, the chances of success are much increased. Now it may be fairly

* On the principle that improved culture improves the whole plant, it may be said that the importation of seeds from China is not necessary. But let me ask which is the best, as well as the safest, plan ? By adopting the one, success is certain, and, moreover, rapidly so ; by adopting the other, its attainment is postponed to a remote and perhaps to an indefinite period.

asked, how are the above qualifications fulfilled in the instance of the present Superintendent of Tea, Mr. BRUCE? The question may appear invidious, particularly to those unacquainted with Assam, but the answer is obvious. Indeed to do Mr. BRUCE justice, I believe he does not pretend to possess either one or the other. As a zealous hard-working person Mr. BRUCE can not well be exceeded, and to these good qualities he adds those of a tolerable acquaintance with the natives of Upper Assam, and of the Assamese language, so far as colloquial intercourse with the lower orders, and the possession of strong physical powers. To counteract the above want of two points, which to speak plainly appear to me to be of paramount importance, the only requisite condition is, particularly if the Tea scheme be of partial extent, to append to the establishment, a person well versed in the theory and practice of horticulture as well as of arboriculture. Unless this be done, no experiment can be tried with any prospect of success. If none such are procurable in India, many are in England; neither would a larger salary than 300 Rs. a month be required to secure the services of a person combining all the necessary qualifications. He should be responsible for the treatment of the plants, while Mr. BRUCE's responsibility should embrace all the other minor details. Relative to this point, I may observe, that the idea of the extreme insalubrity of Upper Assam is totally unfounded, at least so far as Europeans are concerned, and has originated from persons of timid habits, in whose eyes blades of grass are death bearing Toorais.

There is another point on which considerable stress is to be laid, particularly when the extremely indolent habit of the natives of Upper Assam, are taken into account. I allude to the necessity of some one residing on or as close to the scene of

* The relative merits of the superintendants of Tea culture in Java and in Assam, require no comment. In the former country we find the scheme superintended by a naturalist of repute, M. DIARD, who has no doubt contributed largely to its success; in the latter it is directed by a person, who was bred to a seafaring life, and whose long residence in Assam has been devoted entirely to mercantile pursuits, and the command of gun boats.

operations as possible, in order that the labourers may be duly kept to their work. Neither can I conceive what other view could be entertained after the Government had sanctioned the application of Mr. BRUCE for an assistant. Be this as it may, both Superintendent and Assistant reside at Sadiya, three day's march from Tingrei, the chief scene of operations. In this instance the plea of insalubrity cannot be urged. Rangagurrah has every indication of being healthy, and so have several places between that and Tingrei, a distance of about 10 miles.* I may be here allowed to suggest that the appointment of his assistants should not remain entirely with Mr. BRUCE, as was the case in the first appointment.

The last point I would beg to urge, is the placing of the scheme under Captain JENKINS, the head authority in Assam, who in addition to his well known zeal for the welfare of the province under his charge, adds a degree of general scientific knowledge which but few possess.

I cannot conclude this part of my report, without adverting to the extremely desultory manner in which the question of Tea culture in India has been treated by every author who has written on the subject, with the exception of Mr. McCLELLAND. To what conclusion but one can we come, when we find an authority, who has been supposed to be acquainted with the question in all its detail, stating very gravely that a temperature between 30° and 80° is requisite ; and when we find that this is as gravely taken up by a more popular and more philosophical author ! True it is, that neither had seen the Tea in its native state when the statements were made, but equally true it is, that neither can shew a single datum in any of the authors, who have noticed the Tea as it exists in China, on which to found such a curious and rather broad statement. From such loose data, such, indeed, as are generally supposed to be inadmissible into questions of scientific imports, it is that a station between Mussoorie and Deyra Dhoon is stated to be particularly eligible.

* But with regard to insalubrity no reference can be made to the Superintendent, because his freedom from the liabilities of fever formed part of the grounds on which he was raised to his present situation.

The truth of Dr. WALLICH's statements,* "that a very slight acquaintance with the character of the countries where the attempts were made to introduce the cultivation of the Tea plant, is sufficient to account for the total failure of them," has been amply proved by the unqualified success of the Tea culture in Java; although, indeed, Dr. WALLICH's opinion is strengthened by that of Mr. ROYLE, who says that success could not be expected either in Java or Ceylon, the vegetation of both being tropical. I will admit that it is tropical, as, indeed, is the case in other tropical countries at or about the level of the sea, but I believe that mountains exist in both of the magnificent islands alluded to. I have the authority of Dr. BLUME, one of the first living Botanists, and of Professor SCHOUW, a very able writer on Botanical Geography, for making a contrary statement to the purport, that the vegetation of the higher regions of Java (above 5000 feet,) is very much like that of the Himalayas, and probably forms but one with it,† that extra tropical forms exist in lieu of tropical, as oak woods instead of fig-woods, &c. But not only do I object to the desultory style of argument, but to the actual contradictions that appear. How can we reconcile the statement that the Tea "appears to attain the greatest perfection in the *mild* climate about Nankin,"‡ with the selection of spots from 5 to 7000 feet above the level of the sea, in lat. 30° 31.

I trust that the spirit of these observations will be taken in the proper light; that they will not be viewed as originating in a spirit of scepticism, but in a strong wish to protect, so far as my abilities will allow, the interests of the Government which I have the honour to serve. That the Tea plant may succeed in certain portions of the Himalayas is probable enough, but I will not hazard any speculations on this point, until I know the precise circumstances attending its successful culture in Java. That it will not succeed for a very, very long period, unless Tea seeds are imported, cannot, I think, be doubted; that the Himalayas are

* ROYLE's Illustrations, p. 126.

† LINDLEY's Introduction to Botany, p. 513.

‡ ROYLE's Illustrations, p. 127.

not so well adapted as Assam for the cultivation, cannot likewise be doubted, for if "it cannot be a difficult task to transfer from one country to another a plant, which grows naturally and is cultivated extensively, in one which possesses so many of the plants which are common to the two,"* it will, I presume, be allowed to be a much less difficult task to do so, when, with the same similarity in the associated plants, we have the plant referred to itself, occurring naturally and extensively. If these premises be correct, it follows that the culture of the Tea plant should be restricted entirely to Assam.

The success of the scheme cannot depend upon fortuitous circumstances, but will do so on the rationality of the plans adopted. This observation, although a truism to a certain extent, is absolutely necessary. But even supposing that the most rational plans be carried into execution, some time will be necessary before the success of the scheme be complete. But what is a period of even 50 years, if at the end of that time really good Teas can be exported from Assam? I say 50 years, not that I think it will require so long a period; for had good Tea seeds been sent into Assam as soon after the sittings of the Tea Committee as would have allowed the examination of the tracts reported to produce Tea, by competent persons, it is my firm conviction that good Teas might have been manufactured within three years of the present date. As affairs stand now, the scheme must recommence *ab origine*, involving a loss of nearly three years and of large sums of money, to say nothing of the revulsion that must have taken place in the minds of all interested in its prosecution.

I have above stated my conviction, that success is, under the circumstances alluded to, certain: and I have adopted this conviction on the following grounds:—

1. That the Tea plant is indigenous to, and distributed extensively over large portions of Upper Assam.
2. That there is a similarity in configuration between the valley of Assam, and two of the best known Tea provinces of China.

* ROYLE'S Illustrations, p. 124.

3. That there is a similarity between the climates of the two countries, both with regard to temperature and humidity.

4. That there is a precise similarity between the stations of the Tea plant in Upper Assam, and its stations in those parts of the provinces Kiang-nan and Kiang-see, that have been traversed by Europeans.

5. That there is a similarity both in the associated and the general vegetation of both Assam and those parts of the Chinese Tea provinces, situated in or about the same latitude.

I have before more than once alluded to the success that has attended the cultivation of Tea plants in Java. I have but little hesitation in affirming, that Java does not present the necessary qualifications to such an extent as does Assam; yet success has been ensured to an unexpected degree. This success appears to have been obtained by annual importations of excellent seed, and by great care in procuring the best possible cultivators. Of the degree of the success, some idea may be formed by the fact, that a gentleman of great experience recognized in Java Tea taken to Canton, the flavour of the original stock. It is said to have succeeded at Rio Janeiro,* and in the western parts of North America, but in no place but in Java has it been carried to such an extent as to allow of its exportation.

* Mr. MASTERS informs me, that 'he finds' from good authority, that Tea plants are much grown and encouraged at Rio Janeiro, in Lat. 23° S. or thereabouts; they thrive in company with Cloves, Oranges, Pine-Apples. Cinnamon, Nutmegs, &c. in ferruginous clay, in a valley not more than half a mile from the Sea. His authority is Mr. McCULLOUGH, gardener to the Pacha of Egypt.

XLIV.—*Akra grown Cotton.*

Report upon Sample Bales sent to the Honourable Court of Directors by the Agricultural Society of India.

[Read 9th August, 1837.]

TO JOHN BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

SIR,

The report furnished with your letter to the address of Mr. Secretary BUSHBY, dated the 26th of September, 1835, having been submitted to the Honourable the Court of Directors, I am directed by the Right Honourable the Governor of Bengal to forward to you, for the information of the Society, the accompanying copy of a despatch received from them in reply.

2. If the 1st Volume of the Transactions of the Society have been reprinted, His Lordship will be happy to receive, and to forward to the Honourable Court, two sets of the work, along with Volumes 2 and 3, received with your letter of the 11th March last.

I have the honour to be,

Sir,

Your most obedient servant,

*Fort William,
The 11th July, 1837.*

R. D. MANGLES,
Sec. to the Govt. of Bengal.

Revenue Department,

No. 3 of 1837.

Our Governor of the Presidency of Fort William in Bengal.

1. We now reply to your letter, under date the 6th October, (No. 4.) 1835, transmitting the report of the Agricultural and

Horticultural Society, on the subject of the experimental farm established at Akra, and on the success of their labours generally in encouraging the improvement of staple and other articles of produce.

2. We have perused this report with much interest, and consider that great praise is due to the Society for their exertions in the promotion of objects, so highly important and interesting. In the letter from the Secretary, to the Society to the address of the Secretary at this house, dated 19th October, 1835, it is stated that the report is in the Press, and will, probably, arrive in England, in a printed form, as soon as the original copy. We have not, however, received any of the printed copies, some of which you will, of course, transmit to us as soon as they are received by you.

3. We regret to observe that as a whole, the experimental farm at Akra must be considered as a failure, but it is still satisfactory to find, that the pecuniary aid which, under our sanction you have afforded to the Society, has not been altogether unprofitably bestowed.

4. Many reasons are assigned for the want of success in the cultivation of the Cotton seed, viz. calamities of season, bad seed, ignorance of the proper seasons for sowing, choice of land ill suited to the growth of Cotton, (being either too rich or too salt) and an improper mode adopted in the sowing.

5. The Committee, however, appear to be sanguine in their expectations of the benefits which will ultimately be found to result from the facts which their labours have elicited, especially that which fixes and determines the description of seed most likely to become generally cultivated throughout India, namely, the Upland Georgia plant, which the Committee of the Society appear to be confident will ultimately supplant that which is indigenous to the country—"too much attention," the Report states, "cannot be paid to secure and distribute, by every possible means, from time to time, a quantity of this description, until it shall have taken deep root in every part of India."

6. We have submitted to competent judges the samples of Cotton, Cotton Twist, and Cotton Cloth, referred to in the let-

ter from the secretary to the Society, dated the 19th October, 1835 ; and the following is their report on the same :—

Cotton Wool.

<i>Description in Invoice.</i>		<i>Quality ascertained in London.</i>
Cleansed by Saw Gin.	No. 1. From Upland Georgia Seed, gathered in spring of 1832.	Very middling, clean, but poor uneven staple, slightly injured in cleaning ; brownish colour. Estimated value $7\frac{1}{2}$ d. per lb.
	No. 2. ditto, 1832, 1833.	Good, fair, clean and bright ; more even in staple 9d. per lb.
	No. 3. ditto ditto.	Not so clean, $8\frac{1}{2}$ d. per lb.
	No. 4. ditto ditto.	Fair uneven staple, a little leaf remains ; rather high colour, 8d. per lb.
By Churka.		
By Saw Gin.	No. 6. Bourbon seed, 1831, 1832.	Very middling, tolerably clean and good colour, much injured in staple $6\frac{1}{2}$ d. per lb. (The saw gin is unsuitable to this kind of Cotton)
By Churka.	No. 8. Sea Island, 1832, 1833.	Fair, fine, but uneven staple ; a little leaf and much stained. Had this growth been well got up and free from stain, it would have been worth about 12d. per lb. (The Saw Gin is not used for Sea Island Cotton in North America.
By Churka.	No. 9. Upland Georgia, 1832, 1833. from acclimated seed at Akra, being one year in descent from the imported seed.	Very middling ; rather fine but short and uneven staple ; tolerably clean ; and rather high colour, 8d. per lb. Prices in England, June, 1836. Sea Island 23d. to 25d. per lb. Bourbon None. Upland Georgia, 10d. to 11d. Surat, 6d. to $7\frac{1}{2}$ d.

*Cotton Cloth.**Description in Society's Report.**Quality.*

A. 1 Piece,—10 yards, Power Loom.

The material hard and texture open; pretty even in fabric. Value about 5d. per yard, at the utmost.

B. 1 Piece,—20 yards, Native Hand Loom.

Material good; fabric soft but of stripy weaving (*i. e.* thick and thin). Value about 6d. per yard.

Both from Upland Georgia Seed, gathered 1832, 1833, and cleaned by Churka.

The articles are in quality between muslin and calico.

The undermentioned Twist was also from the same Bale of Cotton (No. 5.).

Cotton Twist.

Twist, No. 60.

The Cotton has been badly prepared, both in the cleaning and carding, and is spun too far for the quality. The thread is uneven, and much too soft for weft. The hanks are not uniform in quality, some being No. 60, and others about No. 62, per lb. Estimated value 20d. to 20½d. per lb.

7. With respect to Tobacco, it does not appear "which particular sort is best suited to the climate and soil of Bengal," but the Committee speak with confidence as to the possibility "of improving the quality of this article, so as to render it an export of vast importance."

8. It is shown that Tobacco may be grown at a profit of 12 Rs. 9 as. 9 p. per beegah, or about 39 per cent. on the outlay, and that it does not realise this to the general cultivator is accounted for by the usurious rate of interest which he pays for the Capital employed in the cultivation, which is stated to be frequently as high as 30 per cent.

9. Regarding the Sugar-cane, the cultivation of which was tried on a small scale, no experiments appear to have been made from the stock produced by the Society, the superiority of the

Mauritius cane, however, over the indigenous plants, was fully established.

10. In paragraph 7th of your letter under reply, you have drawn our attention to the ill success that has attended all the efforts used to introduce Agricultural products in Assam.

11. It appears from the documents to which you refer us, that in Sylhet, the soil from its low and swampy nature, is not calculated for the production of Cotton or Tobacco of a superior quality, but that the cultivation of the Sugar-cane might be increased and improved, if plants of a good quality could be procured. Wheat, Oats, and Indigo were considered to have failed.

12. In North east Rungpore it appears to be the opinion of Mr. A. BOGLE, the Officiating Collector, that with better seed all the more valuable articles might be improved in their cultivation, particularly cotton, tobacco and sugar—mustard, it is reported, is grown in great quantities in this district. Great complaints are made, we observe, of the Machinery in use for the manufacture of the sugar, which is described as very rude, and the mode of working it very defective.

13. In Lower Assam, the opposition made by the Chowdries and Malgoozars to the increase or improvement in the cultivation of the staple articles, is the principal reason assigned for the hopelessness of succeeding in any attempt of the kind in that district. Not even the offer of seed and pecuniary aid could, it appears, persuade them to increase the cultivation, or prevail on them to induce their ryots to alter their system—“their fathers and grandfathers got on extremely well with the old Agricultural implements and seeds, and they wished,” they said, “to follow their example.”

14. Tobacco appears to be cultivated in Lower Assam, and of a very good quality, but to a limited extent, not nearly equal to the consumption, and that not by the natives of the province; but it is suggested that no improvement will take place, until the success of foreign skill and capital prove to the natives the profits that may be derived from the improvement in Agricultural products.

15. In our dispatch, dated the 14th October, 1835, we noticed,

with approbation, the exertions made by Major SLEEMAN, Assistant to the Governor General's Agent in Saugor, in improving the cultivation of the sugar-cane in the valley of the Nerbudda.

16. Major SLEEMAN had to contend with all the difficulties and local prejudices enumerated in the reports to which you have referred us, both with regard to the introduction of the superior plant (the Mauritius cane) and to the manufacture of the sugar; and we cannot but conclude, that if the same zeal and perseverance were manifested in other districts where the soil is acknowledged to be favourable to cultivation, they would be attended with the same results.

17. We feel a deep interest in this subject—we are satisfied that you will give it the consideration which its importance demands; and we trust, that by adopting the best means of gradually removing prejudices from the minds of the cultivating classes, you will ultimately effect a considerable and lasting improvement in their general condition.

18. We approve of your having resolved to continue the grant of Rs. 130 per month to the Agricultural Society, hitherto given in aid of the rent of the garden at Allipore, which is now abandoned, (as well as the farm at Akra) in order to assist them in their intention of conferring small rewards for the most successful productions from foreign grains and seeds, to which the future efforts of the Society will be limited.

We are, &c.

(Signed)

J. R. CARNAC.
JOHN MORRIS.
W. S. CLARKE.
P. V. AGNEW.
H. LUSHINGTON.
JOHN FORBES.
W. YOUNG.

J. P. MUSPRATT.
H. SHANK.
H. ALEXANDER.
J. D. ALEXANDER.
J. THORNHILL.
F. WARDEN.

London, 22nd March, 1837.

Revenue Department, the 11th July, 1837.

(True Copy).

ROSS D. MANGLES,
Secretary to the Government of Bengal.

Some discussion having arisen, as to the difference of dates at which these sample bales were valued in London, and duplicates were valued in Liverpool by Messrs. D. and S. WILLIS it was

Resolved,—That the above letter should be submitted to the standing Cotton Committee, to compare dates for the satisfaction of the Society. The following is their report:

Report of the Cotton Committee, on the subject of Samples of Cotton grown at Akra, and referred to in a public despatch from the Court of Directors, dated 22nd March, 1837, read at a General Meeting of the Agricultural and Horticultural Society, on the 9th August, and ordered to be submitted to this Committee for report.

The Cotton Committee have attentively perused that part of the remarks of the Honourable the Court of Directors, in their letter of the 22nd March, 1837, upon the Akra experiments, which relates to the samples of Cotton sent home, and comparing the valuations given in London, of indigenous, American and Bourbon Cotton, with those of the samples in question, are constrained to admit, that degeneracy, to a certain extent, has taken place on all descriptions of Cotton cultivated at Akra.

While the Committee recognize a certain ratio of degeneracy, they are of opinion, that no correct inference can be drawn from prices *alone*, while there is abundant evidence on record,* of the principal causes of such local deterioration—causes, which the Committee are sanguine will not attach to exotic Cotton cultivated in those parts of India peculiarly adapted to the proper developement of the plant, of which the Society is already in possession of several successful examples.†

But the Committee have been called upon to offer their opinion, with particular reference to the discussion which took place

* Vide Report on Experiments at Akra.—*Transactions*, Vol. ii.

† See remarks on Dr. LUSH's Memoir.—*Transactions*, Vol. iii. p. 143.

at the Meeting in August, relative to the difference of dates that occurred in the prices realized for Akra grown Cotton, by Messrs. D. and T. WILLIS, of Liverpool, in March 1834, and the valuation of duplicate samples sent to the Court of Directors, and submitted to competent brokers in June, 1836.

In order to afford the Society and the public, an opportunity of appreciating the accuracy of their views, your Committee annex a memo. of the prices that obtained in the Liverpool market, when samples were sold there in 1834, and valued by London brokers in 1836.

Prices of Cotton.

	Liverpool Price Current, for the week ending 21st March, 1834.				Liverpool Price Current, for the week ending 17th June, 1836.			
	Ordinary to Fair.	Fair to Good Fair.	Good to Fine.	Average.	Ordinary to Fair.	Fair to Good Fair.	Good to Fine.	Average.
Sea Island,.....	d. — 14 $\frac{3}{4}$	d. 15 to 16	d. 17 to 20	d. 16 $\frac{1}{2}$ 11 $\frac{1}{2}$	d. 20 to 21	d. 23 to 25	d. 27 to 37	d. 25 $\frac{1}{2}$ 12 $\frac{3}{4}$
" Stained,	— —	— 11 $\frac{1}{2}$	— —	— 8 $\frac{1}{2}$	— 10 $\frac{1}{2}$	11 $\frac{1}{2}$ to 12	13 to 15 $\frac{1}{2}$	12 $\frac{3}{4}$
Bowed Georgia, ...	8 $\frac{1}{2}$ to 8 $\frac{3}{8}$	8 $\frac{5}{8}$ to 8 $\frac{7}{8}$	9 to 9 $\frac{1}{4}$	9	9 to 9 $\frac{1}{2}$	10 $\frac{3}{4}$ to 11	11 $\frac{1}{2}$ to —	10 $\frac{1}{4}$
New Orleans,	8 to 8 $\frac{3}{8}$	8 $\frac{5}{8}$ to 8 $\frac{7}{8}$	9 $\frac{3}{4}$ to —	6 $\frac{3}{4}$	9 to 9 $\frac{1}{2}$	10 $\frac{3}{4}$ to 11	11 $\frac{1}{2}$ to 13	10 $\frac{1}{4}$
Surat,.....	5 $\frac{3}{4}$ to 5 $\frac{7}{8}$	6 $\frac{1}{2}$ to 6 $\frac{3}{4}$	7 $\frac{1}{4}$ to 7 $\frac{3}{8}$	—	— 5 $\frac{1}{2}$	6 $\frac{1}{4}$ to 7	7 $\frac{1}{2}$ to 8 $\frac{3}{4}$	7
Bengal,	— —	— —	— —	—	— —	— 5 $\frac{1}{2}$	— 6 $\frac{1}{2}$	6

Akra Cotton, sold by Messrs. D. and T. Willis, 31st March, 1834.		Akra Cotton valued in London, 17th June, 1836.			
Cleaned with Saw Gin.	{	No. 1. Upland Georgia, gathered 1832.	„	„	d. $7\frac{1}{2}$
		No. 2. Ditto, ditto, 1832, 1833.	„	„	9
		No. 3. Ditto, ditto,	„	„	$8\frac{1}{2}$
Churka.		No. 4. Ditto, ditto.	„	„	8
		No. 9. Ditto, from acclimated seed.	„	„	8
		No. 6. Bourbon Seed (gathered 1831, 1832,) from Mr. Swoult's plantation.	„	„	
		Sea Island, 1832, 1833, (if well got up.)	„	„	$6\frac{1}{2}$
		Upland Georgia, sold by Messrs. D. and T. Willis,	7d.	„	12

From this statement it appears that *stained* Sea Island was valued in June, 1836, in the Liverpool market, at $12\frac{3}{4}$ d. per lb.—while the sample bale sent from India, as the produce of Akra, was estimated at 12d. per lb.—if *well got up*.

In the despatch of the Court of Directors, this Cotton is reported fair, fine, but *uneven* staple; a little leaf and *much stained*.

The Committee hardly consider it necessary to observe, that the sample sent was composed of produce picked from different sowings. Some in November, others in February, March, and April; and that from these sowings the produce was picked in April, but the greater part in July and August (the very heart of the rains), which satisfactorily accounts for its being *much stained*.

It was cleaned by the Saw-Gin, an operation to which this description of Cotton is never subjected in N. America, and must have injured the staple.

Your Committee further observe, that the Cotton remained in screwed bales in India for nearly four years, and that it was five years old, before it was submitted for opinion in London; a circumstance which must not be overlooked in contrasting prices, if no other disadvantages were included. Add to this, bad seed; and the Committee are of opinion that there is nothing

discouraging in the valuation as relates to this cotton, if grown within the influence of sea air.

The Committee are much more confident of the probable success likely to attend the extensive cultivation of Upland Georgia Cotton; and giving it the benefit of all the disadvantages under which it was tried at Akra, they are sanguine that although, perhaps, there are not, within the delta of the Ganges, many provinces, in which this description can be profitably cultivated, there are many *without* the delta, where the introduction of the Upland Georgia, would, in all probability, be attended with eminent success.

Under the circumstances adverted to, your Committee are of opinion, that the experiments made at Akra, ought not to be received as a criterion of the capabilities of India; and feel just persuasion, that but for the drawback, *old seed*, the several sorts of cotton common to America, might long ago have taken a firm and profitable root in this country; and they cannot recommend too strongly, a continued perseverance, on the part of the Society, in following up the views entertained of the feasibility of bringing them generally, and the "Uplands" in particular, into fair competition with the produce of the United States and Egypt.

W. STORM.
G. U. ADAM.
J. WILLIS.
ALEX. COLVIN.
D. B. SYERS.
C. HUFFNAGLE.
JOHN BELL.

To JOHN BELL, Esq.

MY DEAR SIR,

Herewith you have the Cotton Committee's box returned to you.

I entirely concur in the Report of the Committee, but not

having attended to the matter lately, nor read, at least, recently, the Court's letter, I do not sign it.

Yours truly,
W. EARLE.

November 22, 1837.

NOTE.—*Upon reading the Report drafted by Mr. Bell, for the approval and signature of the Cotton Committee.*

As the Report has already the signatures of six members of the Committee, it would be now too late to suggest attention. Moreover, though every part of it has my approbation, except the opinions expressed as to the future, and the inferences drawn from the supposed causes of failure at Akra; these exceptions are so important, that it is not likely there would have been a concurrence between my colleagues and myself in any report upon this subject.

The Report, as now drawn up, admits the entire extent of inferiority in quality which my minute described, but it refers the whole of it to the locality of Akra itself, of old seed, and mixture of produce gathered at different seasons. The first objection I consider very insufficient to account for the far greater deterioration of quality in the Sea Island and Bourbon sorts, than in the Bowed Georgia; nor am I of opinion, that Akra was a very unfavourable position *in Bengal* for the strong southerly winds of March, April, and May, our sea breezes differing little in temperature and moisture at Saugor and at Akra. The fault I hold to be; first, in the higher temperature than that of the native climates of the Bourbon and Sea Island species, more than in the badness of soil; secondly, in the almost constant drought during the flowering season here; and thirdly, in the intervention of a winter between the first and second flowering, which flowering would be continuous, both at Bourbon and in the United States, the entire growth in the plant in the latter, being from the spring to autumn. The objection of *old seed* would not be valid in some cases of failure, within my own knowledge, particularly a very extensive

plantation of Sea Island Cotton at Balasore, in 1826 and 1827, which produced literally nothing. Besides, the Georgia Cotton has thriven, though not without some degeneracy. It is observed that musters of fine Sea Island have been procured from Saugor. I know the history of those musters, having given the seed and directed the trial, which was not successful, but only less a failure than some others, because the plants were all treated like garden plants. If any one instance among the very many trials of the Sea Island and Bourbon species in Bengal could be adduced, as indicative of success, there might be reason for hope, but there *has not been one*—a fair muster or two have been exhibited, picked from the best pods; but what has been the quantity produced on a given area? Not a tenth; sometimes, not a hundredth part of what it ought to be. I, therefore, think the further prosecution of experimental planting in those two species quite useless *in Bengal*—that sufficient has been already done in the way of experiment,—that to urge further trials in Bengal is only to throw away the Society's money, and to hold out fallacious hopes to the public. Dr. HUFFNAGLE appears to concur with me generally upon the point of degeneracy, and I think he would have done so in deprecating further trials of the same kinds of Cotton, if he had been equally acquainted with the details of many already made and watched with every care.

The Georgia species I look upon as an acquisition, and having partially succeeded *every where*, likely to do very well in some of our various climates. To the further dissemination of this species, attention may well be devoted. But I would rather see the Society leave it now to itself, and use every means of introducing species yet untried, instead of wasting its time and attention upon the repetition of experiments not likely to elicit further information, or to lead to any good result.

G. A. PRINSEP.

XLV.—*Caoutchouc.**First of Circular of 11th November, 1837.*

TO JOHN BELL, Esq.

Secretary to the Agricultural Society.

MY DEAR BELL,

May I beg you will have the goodness to present the accompanying three pieces of Caoutchouc, (2 thick and 1 thin) to the Agricultural Society at their next Meeting, from Captain JENKINS, on behalf of Assistant Surgeon SCOTT, of Gowahatty, who has prepared them

I believe these specimens will be found equal, if not superior, to any which have yet been received. I received them by baulky a short time ago.

Yours, &c.

(Signed) N. WALLICH.

November 2d, 1836.

P. S.—The above specimens have undoubtedly been prepared by Mr. SCOTT, from the milk of the *Ficus elastica*.

Second of Circular of 11th November, 1837.

TO JOHN BELL, Esq.

MY DEAR BELL,

The accompanying note from Capt. JENKINS, dated the 27th ultimo, reached me yesterday, together with five specimens of Caoutchouc, prepared by Dr. SCOTT, at Gowahatty, and exceeding, I think, in beauty, any specimens which have yet reached the Society, not even excepting those that were very lately presented by the same gentleman.

You will observe that the specimens are numbered 1, 2, 3, 6 and 7, corresponding to the list attached to Capt JENKINS's let-

ter, and which gives an account of the manner of preparation of each sample.

It is a pity that these specimens are so small in size, but I have no doubt that Dr SCOTT will be happy to prepare them of any size or shape, on the Committee's expressing a wish to that effect.

Yours truly,
N. WALLICH.

Botanical Garden, 9th November, 1837.

MY DEAR WALLICH,

I have the pleasure to send you some samples of India Rubber, prepared by Dr. SCOTT, on which I should like to get your Committee's opinion as to quality and value; and if the Committee can obtain any information of other superior modes of preserving the juice, I hope you will endeavour to get them to communicate the same, *pro bono publico*.

I am, Sir, &c.
F. JENKINS.

To Professor WALLICH.

Specimens of Caoutchoue.

- No. 1. Juice worked with the hands and allowed to dry in the shade.
- No. 2. Juice boiled and pressed.
- No. 3. Ditto. poured into gurrahs and dried in the sun.
- No. 6. Juice poured into a dish and left till dry.
- No. 7. Juice worked with the hands, and then subjected to pressure of 3 or 4 maunds.

In Capt. JENKINS's letter of the 27th October, 1827.

Third of Circular of 11th November, 1837.

MY DEAR SIR,

The large sample is Penang Caoutchouc, the others are from S. America, I believe cut up, and manufactured in London. The Penang is sold at 2d. the pound; the other at 1s. 6d.—the

reason of the difference is merely from the want of cleanliness in preparation, the gum itself being in quality equally good ; these are sent from an Indian Rubber Manufactory, near town, towards Barnett.

Yours very truly,
W. CRACROFT.

31st October, 1837.

Report of the Caoutchouc Committee, on specimens produced by Assistant Surgeon SCOTT, and on samples presented by Mr. CRACROFT.

[Read 13th December, 1837.]

1st. Assistant Surgeon SCOTT's specimens, as per letter, No. 26, of November proceedings. Two thick specimens, and one thin ditto, forwarded by Captain JENKINS to Dr. WALLICH, and by Dr. WALLICH to the Secretary, as per letter (copy) annexed, dated November 2nd, 1837.

Memo.—No particulars given as to the manner in which these samples were made.

2nd. Assistant Surgeon SCOTT's further specimens, accompanied by a note from Captain JENKINS to Dr. WALLICH, dated October 27, 1837; and by a note from Dr. WALLICH to the Secretary, dated November 9, 1837, forwarding 5 specimens, as follow :

Ticketed No. 1. Juice worked with the hands, and allowed to dry in the shade.

„ No. 2. Juice boiled and pressed.

„ No. 3. Juice poured into gurrahs, and dried in the sun.

„ No. 6. Juice poured into a dsih, and left till dry.

„ No. 7. Juice worked with the hands, and then subjected to pressure of 3 or 4 maunds.

3rd. Three samples of Caoutchouc, as per note, from Mr. CRACROFT to the Secretary, dated October 31st, 1837.

per lb.

One thick piece, the produce of Penang, in its original state, 2d.

One thin skin of Caoutchouc reprepared in England, from South American produce, 1s. 6d.

One cut into string, re-prepared in England from South American produce, 1s. 6d.

Sent from an India Rubber Manufactory, near Town, towards Barnett.

The foregoing specimens having been submitted to the Committee, the Members agree on the following report.

1st. The two thick specimens of Assistant Surgeon Scott, sufficiently indicate the excellence of the gum, and the only difficulty felt in reporting upon it, proceeds from a want of knowledge as to the best mode of preparing it. No doubt can be now entertained, that Assam is quite capable of competing with any part of the world; and it only remains to be ascertained, what quantity the country is equal to the production of. There is one observation, however, applicable to these two thick samples, they appear to be in a more crude state than the best specimens of South American Caoutchouc, and this crudeness seems to be attributable to the juice being run into too great a mass, instead of being prepared by layers, whereby it obtains the same degree of consistence throughout.

Even the thin specimen is not free from this objection, and a want of elasticity is the consequence. On application of the finger to the thin parts, the membrane gives to the nail, and then breaks; the same test applied to a *very thin* specimen presented by Mr. CRACROFT, prepared in England, a far greater proportionate degree of elasticity and strength is observable, and this can only be obtained by some superior process of manufacture; and from the circumstance of having received a bottle of Caoutchouc, with the model of a wooden mould, and directions based specially on this form, it would appear that this

process of dipping the mould into the raw juice, by which each layer has the advantage of atmospheric air, is considered essential to the *curing* of the Caoutchouc, and that a more simple operation would have been suggested, if re-preparation in England were considered necessary on obtaining the crude juice in any shape from countries where it is produced.

Excepting this apparent disadvantage, these three specimens are very encouraging, and do much credit to Dr. SCOTT's persevering research.

2. Here the Committee have a more satisfactory field of enquiry open to remark; the process of obtaining the different specimens is clearly described, and it would be exceedingly desirable, to have the opinion of competent judges in England upon these, as well as those which precede them from Lieut. VERCH.

Whether the Caoutchouc Company, or the Society of Arts, would be the most proper channel through which to obtain the information required, will be for the Society to determine. The Secretary has, it seems, already placed himself in communication with both, in search of what appears absolutely necessary to ascertain, before parties go deeply into the speculation, and if these communications are followed up, by a transmission of samples, the Committee anticipate a favourable accession of valuable information, since it is hardly to be obtained on the spot, where those who possess it, are guided by self-interest to make it as great a mystery as possible.

On examining Dr. SCOTT's samples, marked No. 1, 2, 3, 6, 7, the qualities appear to stand in the following order :

- No. 6. Best quality.
- No. 3. Second best quality.
- No. 1. Third best quality.
- No. 7. Fourth best quality.
- No. 2. Fifth best quality.

No. 6. Exhibits a far greater proportionate degree of elasticity.

No. 3. Is only inferior to it from a greater quantity of impurity, and a less degree of application to the action of the air.

No. 1. Is good pure Caoutchouc, but from being worked in the mass, is in a great measure deprived of its elastic power, and it would appear that the process adopted to obtain the sample is really more tedious, than that of dipping, or besmearing the block as observed in South America.

No. 7. Is made in the same manner as No. 1, with this difference, that this sample is subject to *pressure*, an addition of labour, which does not appear to be recompensed by any improvement.

No. 2. Is the least recommendable process, as far as the sample admits of comparison, and as it is the most expensive, it is the less to be regretted, when the natural elements contribute so perfectly to give us an article of the best description, any application of artificial means should be avoided, when we find that so far from improving the quality, it is thereby injured.

If Caoutchouc is required for the market in massive lumps, it would seem that some more efficient means might be devised, than working by the hand, which process appears only to have been of advantage in subjecting the lump to a more bountiful action of the atmosphere, as in the ratio of diminished thickness, the samples exhibit a decided superiority.

3. These samples are valuable, as subjects for comparison.

The thick specimen, the produce of Penang, is evidently good Gum, but carelessly collected, being mixed up with bark and other impurities; it is valuable as shewing, that, however good the raw product, its value is materially effected by the primary mode of preparation, and in nothing more than the article before us; since upon a large scale, if this article is recommended to be prepared in the *lump*, it may be adulterated to a great extent, from the difficulty of ascertaining the quality throughout before subjecting it to re-dissolution. This specimen is valued at 2d. per lb. The thin membrane and string samples are valued at 1s. 6d. per lb. and it is quite clear from the quality of several of the thinner samples forwarded by Capt. JENKINS from LEUT. VETCH, and Assistant Surgeon SCOTT, that those enterprising gentlemen are quite equal to produce

with a little more practice and experience, Caoutchouc that would readily bring 1s. per lb. in the English Market.

Your Committee desire to express their thanks to Mr. Assistant Surgeon SCOTT for these valuable specimens.

RADHAKANT DEV.

RAMCOMUL SEN.

W. B. O'SHAUGHNESSY.

N. WALLICH, M. D.

JOHN BELL.

FREDERICK CORBYN.

*Agricultural Society's Office,
Calcutta, November 11th, 1837.*

XLVI.—Guinea Grass.

Report of the Committee appointed by a General Meeting of the Agricultural Society, on the 8th November, (instant) to examine the condition and extent of Mr. BELL's Guinea Grass cultivation.

[Read 13th December, 1837.]

The Committee met at Mr. BELL's Garden, on Thursday evening, the 16th instant, and walked over the ground. The Guinea Grass is planted out in regular rows, and exhibits a vigorous state of cultivation; although Mr. BELL informed the Committee, he had taken off one entire crop of seed, and was then taking off the second top cuttings, which had been left to ripen.

The land, under Guinea Grass culture, was estimated by Mr. BELL to exceed 10 beegahs, and appeared to your Committee fully to warrant this assumption: but they thought it would be more satisfactory to place the question beyond doubt, and accordingly.

Resolved,—That the extent be ascertained by actual measurement.

Mr. GIBBON having offered to get this done, the Committee have the pleasure to submit a plan of the ground, taken since their visit, by Messrs. BURN and Co., exhibiting an actual cultivation in Guinea Grass, of

Bs.	cotts.	chitts.	feet.
10	„ 7	„ 13	„ $\frac{5}{4}$

which, with reference to the regular and healthy appearance of the whole, they consider fully entitles Mr. BELL to the 2nd class medal and premium; as well as to the first class premium on seed, (of which he has sent in to the Society, much more than was required,) provided no more successful candidates come into the field, before the date appointed by the resolution, for awarding the prizes, viz. the 1st of January next.

W. F. GIBBON.

T. LEACH.

A. R. JACKSON.

Calcutta, 24th November, 1837.

XLVII.—Cotton.

Opinions of the Committee on Samples received with communications from E. A. BLUNDELL, Esq. (Read 10th May, 1837.) From W. C. CRANE, Esq. (Read 10th May, and 12th July, 1837.) From D. F. McLEOD, Esq. (Read 3rd October, 1837.)

To A. COLVIN, Esq. W. STORM, Esq. Dr. HUFFNAGLE.

Members of the Cotton Committee.

The Secretary has the honour to submit the following original communications and samples for the opinion of Members, and will feel much obliged to them to return the papers and samples at their earliest convenience.*

* As there are nine Members upon this Committee, in addition to the Secretary, he proposes to divide the labour into three sections.

1. Of Messrs. COLVIN, STORM, HUFFNAGLE and BELL.

1. Of Messrs. WILLIS, EARLE, PRINSEP and BELL.

1. Of Messrs. SPEIR, SYERS, ADAM, and BELL.

1st.—From E. A. BLUNDELL, Esq. dated Moulmein, 2nd April, 1837, presenting samples of *Pernambuco* Cotton, grown in that country, viz.

Produce of Season 1837.

On one soil. { No. 1.—From trees of two year's growth.
No. 2.—From trees of nine month's ditto.
No. 3.—From trees of two year's ditto.

Two different soils. No. 4.—From trees of nine month's ditto.

2nd.—From W. C. CRANE, Esq. of Calcutta, dated 26th April, 1837, presenting, on behalf of his brother at Singapore, sample of *Upland Georgia* Cotton, grown in that Island, from seed forwarded by this Society; also a sample of Manilla Cotton, grown in the same place.

3rd.—From W. C. CRANE, Esq. dated 6th July, 1837, presenting a specimen of *Sea Island* Cotton, grown at Singapore, from seed forwarded by this Society.

4th.—From D. F. McLEOD, Esq. dated Calcutta, 18th September, 1837, presenting samples of Cotton, the produce of Seonee and Berar.

A.—“Munnooa” (green seed), crop in March and April.*

B.—“Deo” (black seed), crop in April and May.

C.—Berar Cotton.

D.—The produce of Egyptian seed, sent up by this Society, sown in July, 1836.

Singapore Cotton.

The specimen of “*Sea Island*” Cotton, grown at Singapore,

The next samples will be submitted to Messrs. WILLIS, EARL and PRINSEP.

The next to Messrs. SPIER, SYERS and ADAM, and so on.

This arrangement, it is hoped, will allow samples to pass through the Committee speedily—as nothing contributes more effectually to keep up an interest in these enquiries.

J. BELL.

Secretary.

* Perennial, yielding in the hot weather, and not as the country annuals, at the close of the rains.

from American seed, and presented by Mr. CRANE, is, according to my opinion, superior to either of the other samples before me.

It is silky ; long in staple, with a strong and even fibre. We cannot, however, form a correct estimate of the average quality of the Cotton from this plantation, as it appears by Mr. CRANE's letter, that he has sent us "*only a few of the first pods,*" which have, no doubt, been carefully picked.

The soil, however, "sandy and near the sea," appears to be well adapted for this variety, and if the *whole crop* will bear any comparison with the first portion produced, this experiment at Singapore may, I think, be considered as very successful.

The "*Upland Georgia*" Cotton does not seem to be so well adapted to the soil and climate, being "woolly," and the seed separable with difficulty, but the *staple* is good.

The *Manilla* appears to be a failure, being harsh, with a short and weak fibre.

Moulmein Cotton.

The quality of the Cotton presented by E. A. BLUNDELL, Esq. (particularly No. 4) is so superior, that I much regret the quantity produced did not answer Mr. B's. expectations. On perusal of his letter, I was induced to make inquiry of Messrs. GILMORE and Co. regarding 300 lbs. which Mr. B. forwarded to those gentlemen ; and through the kindness of Mr. CRAWFORD I am enabled to append the following memoranda, and to present, in his name, to the Society, specimens of the Cotton in its several stages of manufacture, viz. rove, cope and thread.

"It will require about No. 60—is *very fine and of good staple, lost much less in proportion than the country cotton*, and is worth from 18 to 20 *Rs per maund*."

The remaining specimens are so inferior to the foregoing, that I prefer leaving my colleagues, who are so much better qualified to judge than myself, to append an opinion.

C. HUFFNAGLE.

I agree with Dr. HUFFNAGLE in his remarks on the Singapore Cotton, and would recommend in future to send only the Sea Island Cotton seed to the Straits, Moulmein and Arracan.

The Pernambuco Cotton and manufacture of it at Gloster, proves it to be a superior article, and it is to be regretted that Mr. BLUNDELL should consider it a failure.

The other specimens from Mr. McLEOD are all inferior, but the second class, Behar, seems the best.

W. STORM.

I have had a careful examination of these Cottons, which almost entirely correspond with Dr. HUFFNAGLE's opinion, and recommend, with Mr. STORM, that the Sea Island seed be especially relied upon on the eastern coasts and the Straits. At the same time, it seems desirable that Mr. BLUNDELL should be solicited to continue his experiments with the Pernambuco seed, the cotton from which has produced a stronger thread, than is usually imported here from England. It is well twisted, and although a little knotty, is very creditable to the Gloster Mills.

I am sorry that the samples from the west are not very favourable. The specimen D from Egyptian seed is short and weak—the west seems to me to be C from Berar;—it is not easy to judge of the cleanness from such small quantities—but if ever these could be brought to market as free from impurities it would be a great gain,

A. COLVIN.

XLVIII.—*Otaheite Cane.*

Proposal to send a small vessel to the Island of Otaheite for a supply of Cane.

[Read 13th September, 1837.]

TO JOHN BELL, ESQ.

*Secretary to the Agricultural and Horticultural Society,
Calcutta.*

I have read with much interest the proceedings of the So-

ciety on the 9th instant, particularly that portion which embraces the Report of the Sugar Committee.

I am in possession of a considerable tract of country, the soil of which, upon a general average, I fully believe to be equal to, if not *the* best in Bengal for the cultivation of Sugar-cane. In using this sweeping assertion, I am, in a great measure, borne out by the fact, that Sugar-cane is the *staple* of the estates in my possession, as well as that of the adjoining Zemindaries, to the extent of 20 or 30 miles.

Some 30 or 40 years ago, the Company had a large Sugar manufactory at Dumdumma, and at this place (Paunchbibbee) only two miles from the former, an individual (Mr. CHRISTIE) had a concern of the like nature, including a Rum Distillery. Mr. C. it is said, realized a large sum, and the Company's Sugar was rated at No. 1 by the Board of Trade, which implied its superiority to all other sugars then purchased by them.

With the above *data* before me, and the great encouragement of the whole of my ryuts, most eager to increase and improve their cultivation to any extent, by the introduction of a better species of cane, I am, I think, fully warranted in putting my horse *Sugar-cane* in nomination for the Agricultural and Horticultural Society's cup and purse, to be run for on the 1st January, 1839; or in other words, being first for the prize of the premium and the Gold Medal on that date.

If I can obtain a sufficient quantity of seed canes, it is my intention to grow 200beegahs, *neiz* cultivation, and the like quantity by ryuts; and this part of my subject brings me to the purport of troubling you with this letter, which is, to solicit your aid in procuring the only thing needful to my success, viz. the proper seed-canes. I should be most happy to go to any reasonable expence in obtaining them—would you kindly exert your interest in my behalf, by putting me in the way of getting supplies, either from the Mauritius or the Upper Provinces? (I imagine the former is most preferable) and you would infinitely oblige me.

Whilst upon this topic, allow me to suggest the hire of a small

vessel, and sending her for a cargo of Sugar-cane direct from the Island of Otaheite. It is not too much to suppose, that there are many others, desirous like myself of embarking in this cultivation, and of possessing the very best species of cane for the purpose of seed; and that a sufficient number of subscribers would be found to cover the cost of such an undertaking. Shares of one or two thousand rupees would answer best. I, for one, would be most happy to risk 1000 Rupees for a chance of a supply of cane from the parent stock. If this suggestion is at all of a feasible nature, I have no doubt but that yourself, or some of your commercial friends, will be able to embody it into a plan, conducive to the interest and wishes of all parties—but the grand *desideratum* would be, having it in Calcutta during the whole of January next, as the planting in this place is *in all February*, and it would occupy a month getting to its destination in most of the remote parts of Bengal; my own quarter for instance.

I am sorry to say, that almost all my Cotton seeds have failed, owing to having been sown too late in the season, and the extraordinary long drought we sustained.

Can you kindly furnish me with a fresh supply? it is sown in these parts in the months of September and October, (Assin,) and reaped in May; and it is the next best cultivation the ryots have, and they are very anxious to get more seed, from the specimens they see of what has succeeded, of which I hope to send you a small quantity at the end of next month; what little there is, was sown in May, and was lately in blossom, but much has been injured by the heavy rains; it remains to be seen if it will be a second.

Pray let me have as liberal a supply of fresh canes as you can spare and be so good as to forward them by any of the steamers to the care of my Mookhtar, Rammohun Sain, Judge's Court, Bauleah.

I remain,

Dear Sir,

Yours faithfully,

J. W. PAYTER.

Paunchbibbee Cutcherry, Bogoorah,
25th August, 1837.

P. S. You may, perhaps, wish to know the locality of my Sugar country,—turn to the map and look for “Appole,” between Bogoorah and Dinagepore, 20 coss from the former, and 24 from the latter.

TO A. COLVIN, Esq. N. ALEXANDER, Esq. DWARKANATH TAGORE, Esq.

Members of the Sugar Committee.

The Secretary has the honour to submit, in original, a letter to his address, from Mr. J. W. PAYTER, of Bogoorah, dated 25th August, 1837.*

Suggesting that with a view to obtain a good supply of the real Otaheite Sugar-cane, a small vessel might be hired, and sent to bring a cargo of cane cuttings direct from the Island of Otaheite, and that those favourable to the undertaking be invited to take shares of one or two thousand rupees each, and offers to pay down 1000 rupees himself towards the scheme.

It will be for the Members now addressed to state how far in their opinion, such a scheme is practicable, with what chance of success they would feel disposed to recommend its adoption.

The Secretary has ever been, and still is a strong advocate for the speedy introduction of the Otaheite cane, and for the extermination of the indigenous cane, and hesitates not to hazard an opinion, that in ten years from this date, this result will

* As there are *ten* Members upon this Committee, in addition to the Secretary; he proposes to divide the labour into three sections.

1. Of Messrs. COLVIN, TAGORE, ALEXANDER and BELL.

1. Of Messrs. ADAM, MULLER, HARE and BELL.

1. Of Messrs. ALLAN, MASTERS, STORM, DOUGALL and BELL.

The whole of the Members, above mentioned, may be consulted, when a difference of opinion exists; and when any of the Members are absent, we can draw upon another section.

The next question will be submitted to Messrs. ADAM, MULLER and HARE.

The next to Messrs. ALLAN, STORM, DOUGALL and MASTERS, and so on.

It is hoped that this arrangement will admit of questions being speedily disposed of, which is the main spring to the successful working of Committees.

J. BELL,

Secretary.

have been attained ; but, however anxious he is to see his anticipations realized, he does not wish to see zeal outran by indiscretion ; and in his humble opinion, Mr. PAYTER's scheme is not practicable. That a vessel might be freighted in these times of superabundant tonnage, there can be no doubt, and that there are public spirited individuals who would contribute to the plan, is equally tangible ; but he is certain that the speculation would end in mortification, and that it would injure the cause materially.

The Society has offered very handsome premiums to tempt importation of superior cane, and if successful, the end in view will be gained. If unsuccessful, we have enough of Otaheite cane at Jubbulpore, in the Society's Nursery, and in the Secretary's garden, to plant all India very shortly. It is true many have been disappointed in their applications to the Nursery, but they ought to bear in mind that it is not much more than a year old. The Committee are now busily engaged in extending the cultivation, and in another year their labours will be better understood. We are, therefore, independent of foreign supplies, *even if disappointed* under the offer of premia, and however desirable to accelerate the progressive introduction of superior cane, we must be cautious not to push the measure beyond our strength, for hope buoyed up too much might end in disappointment and labour lost. We are going on steadily, and have almost a certainty within reach ; a scheme or bubble, would only shew our weakness.

I regret being obliged to concur in the Secretary's opinion as to the inexpediency of the Otaheite ship. If we can spare any seed-canes from this, I believe they cannot be placed in better hands than Mr. PAYTER's ; and it may be well to inform him, that he may also be able to obtain some from Mr. ANDREW ANDERSON, who tells me he has about five begahs of beautiful canes at his factory of Hatoury, in eastern parts of Tirhoot.

The subdivision of the Committee is a great improvement.

A. COLVIN.

I agree with the Secretary—premiums on the only true efficient mode for the Society to extend improvements by leaving individuals to work out the details. Mr. BLAKE has promised me a detailed report of his experiment of the Tahiti cane, on which I formed my opinion, that it would not answer in Lower Bengal, (*not in Hindoosthan*) so well as the small China cane. When I receive it, I will submit it to the Committee, as it is advisable to hear many thing *pro and con* before parties go deeply into the business.

N. ALEXANDER.

I regret that my continued indisposition, since the formation of the Committee, prevented me from attending it. I entirely agree with our Secretary, as to the inexpediency of engaging a ship for importing real Otaheite cane, but to secure its supply by premiums offered to the importers. In regard to the doubt entertained by my friend ALEXANDER, as to the growth of Otaheite cane in Bengal proper, I can assure him, though my first attempt at Barrypore in growing the cane, failed, owing to the unfavourableness of the soil; yet I was fully successful at Comercolly, as far as growth is concerned. My plantation was destroyed by frequent invasion of hogs, too numerous in that district; but if guarded by strong hedges, I am satisfied the Otaheite will grow as healthy here as China, or any other cane.

DWARKANATH TAGORE.

Report of the Sugar Committee, on a suggestion of Mr. J. W. PAYTER, of Bogorah, conveyed in a letter to the Secretary, under date, August 26th, 1837, read at a General Meeting of this Society, on the 13th September, and submitted to this Committee for consideration.

[Read 13th December, 1837.]

Subject.

Mr. PAYTER proposes, for the consideration of the Agricultural and Horticultural Society the scheme of taking up a small

vessel direct for the Island of Otaheite, with a view to obtain a cargo of canes for the benefit of parties who would contribute funds towards effecting the object contemplated.

REPORT.

Your Committee, having given the subject of Mr. PAYTER's proposition their best attention, entirely coincide with that gentleman, as to the desirableness of obtaining, and distributing as extensively as practicable large supplies of this superior cane, but regret, that they cannot recommend, under any probable prospect of success the adoption of a measure, wherein the risk is so great, and the result, even under the most favourable circumstances, so far problematical.

The Committee are of opinion, that the object which Mr. PAYTER has in view, will be more easy of accomplishment, through the means already proposed by advertizement, viz. the offer of medals and premiums for a given quantity of canes imported. But presupposing that this method of inducing individuals to bring good canes from abroad, were ineffectual, the Committee would still hesitate to advise a measure which they think would end in disappointment to all concerned.

The Committee have good grounds for believing that we are independent of importations, and that however desirable it is to encourage the influx of supplies, by legitimate means, in order to accelerate the end in view, there is not a doubt, but with the resources already at our disposal, the object will soon be compassed.

The Committee commend the public spirit evinced by Mr. PAYTER, and with reference to the extent of land which he is anxious to cultivate in cane, desire to recommend that as large a supply as possible may be allotted to him from the Society's Nursery, consistent with the claims of other applicants when the time of distributing cuttings from this source shall have arrived.

A. COLVIN.
DWARKANATH TAGORE.

N. ALEXANDER.
J. BELL.

XLIX.—*Machine for Raising Water.*

*Extract of a letter from J. F. SANDYS, Esq, to the Secretary,
dated Garden Reach, 12th December, 1837.*

(Read 13th December, 1838.)

“I have much pleasure in sending models of two Machines invented by Mr. TEIGNMOUTH SANDYS, C. S. of Arrah; which I shall thank you to submit to the inspection of the Society. To explain the principle of their construction, and mode of operation, I hand you a copy of his memorandum sent for my information.”

The Bi-Lever Balance, Crane ;

or

‘ Jack and Jill.’

The principle of the Machine is of the simplest kind. It is, in short, the application of the common endless Chain, operated on by two Levers, balancing evenly; and alternating on this principle, work a counterpoise attached to one of the said two Levers: which, though not the chief, yet forms its secondary force. The chief or the moving power, is the weight of men or of larger animals, walking in, and out of both the Levers; thereby creating the actions of ascent and descent.

Models of the same on two plans, accompany: one marked No. 1, and the other No. 2. They will be readily understood without farther explanation, and I shall, therefore confine myself to a few remarks illustrative of their practical application, as tending to exercise the question of the utility, or inutility of the invention.

Animal weight is in every respect, more powerful than animal force, that is, where any arrangement of machinery, will admit of the former being fully and effectually brought into play. If this be not realized by the present invention, it posses-

ses little other merit. EULER's formula estimates, a man working to the greatest advantage when carrying a load of 27 lbs. and walking at the rate of a mile and one-third an hour." Then let his average weight be little more than four times that amount, say 120 lbs, or nearly 9 stone—it will be within the most liberal computation to assume, that he can carry his own weight, in any ordinary position of acclivity at a similar rate.

The models, No. 1 and 2, are made on a scale of three-fourths of an inch to a foot of a machine of this description, which I have had in constant work for the last three months. The shaft of my working machine, however, was not dug one half of the depth shewn in the models, and being simply experimental, it was excavated in a kutcha manner, and not faced with masonry, as would be necessary for a fixture. The water in the well also, was at a great depth—33 feet from the surface, consequently I could not employ the small well, or moth barrel,* which, being half the diameter of the lever barrel, the extra power gained thereby will be self evident to the Mechanic;† but was obliged to content myself with the well barrel and Lever barrels, being of equal diameters. This power of the Machinery, therefore, will be practically useful only in cases in which the water is much nearer the surface. Bearing in mind the difference thus explained, the working results obtained will be found as subjoined.

Two common bazar moths were attached by separate ropes to the well, or moth barrel. By actual weight,

	Mds.	Srs.
One contained water,	2	13 puckha.
The other,	2	4 „
Total Maunds	4	17—362 lbs.

The counterpoise attached to the lever weight, 3 maunds 30 seers puckha; thus, less the weight raised, 27 seers, 54lbs. Three

* The wheel on which the endless Chain revolves.

† Proof:—To the well barrel rope, fasten Wt. $5\frac{1}{2}$ Chs. loosen the Lever ropes, and in lieu fasten Wt. $3\frac{1}{2}$ Chs. thereto.

Result, weight $3\frac{1}{2}$ Chs. raises Weight $5\frac{1}{2}$ Chs.

men whose average weight was about $7\frac{1}{2}$ stone each—but say, take the quantity above assumed, or 9 stone each, 120 lbs. total for the three men, 360 lbs. kept the machine in active motion. It will be remarked, that the counterpoise is excessive in ratio to the weight raised ; strictly, the counterpoise ought to be equal to half ; and the circulating, or animal weight, the remaining half of the weight raised. But, in practise, this is a very slow, and even laborious way of operating ; as this weight of itself is not sufficient to give the requisite impetus to the machinery, to enable it to act readily and rapidly. I have tried it on this reduced scale ; but, then it became necessary, to call into aid animal force as well as weight ; the foremost man on the lever, working the rope of the lever below. The excess counterpoise above given, with one man at the end, and the other two advanced only one-fourth way on the lever, were quite sufficient to put the machinery in as quick a motion as is desirable : thus giving a saving both in time and labour. It was preferred by the workmen themselves ; and accordingly adopted by me, as the working scale.

Lastly, “a horse,” according to Desagulries, “drawing a weight out of a well, over a pulley, can raise 200 lbs. for eight hours together, at the rate of two and a half miles an hour.” Certainly, no pair of the ordinary native oxen work the moth at this rate. Then, let the matter be reduced to native test, *i. e.* under comparison with the common working of the moth, the machinery gives a saving of the cattle,—and working all day, they generally employ two pair of oxen,—in as much as it only employs their drivers, *i. e.* two men, one driving the cattle, and the other attending the Moth. This is the usual practice of Behar : and gives four men for two moths ; three of whom, worked the levers of my machine, and one attended the moths.

After considerable practice, it was calculated that as much water could be raised by mid-day with the machinery thus described, as would employ the native with two moths, and four pair of oxen the entire day ; or about sufficient to irrigate four beegahs of land, at two beegahs to each moth.

But if the scheme of model No. 1 is satisfactory, as having been practically tried, and its working effects on a large scale ascertained; I am anxious to direct particular attention to model No. 2, which, though on the same principle, is of different combination and value; as realizing a much greater saving, both of machinery and labour. It is, at the same time, a working model, to which extent No. 1 is not provided; and, therefore, admits of practical examination: and for which purpose, weights and scales accompany. With model No. 1, a shaft is required independent of the well; but according to model No. 2, the shaft may be cut out of and form the well itself; or in a tank: and, in all similar situations, its application is self evident. It works also almost entirely on the line of acclivity; and this defect cannot be avoided, without sinking the shaft of No. 1, to water line, when, under such circumstances, No. 2 becomes the most economical application.

Observing the directions noted on the model, it will be found that,

	Cks.
The weight of water raised is	22
Ditto of counterpoise	13
Ditto of representation of animal weight, ycleped	14½

Baboo Egaruh Chuttackjee put it in motion; and the result obtained is, that animal weight to the amount of 14½ cks. raises 22 cks. of water.

By the foregoing data, as well as that given in the first instance regarding model No. 1, I resolve

First,—That the power gained is, in animal weight over animal force, about 2½th.

Secondly,—By the counterpoise, about 3⅓th.

T. SANDYS.

Arrah, 14th of July, 1837.

After the paper was read, the Secretary proposed, “that a machine be constructed after Mr. TEIGNMOUTH SANDYS’s model, No. 2, at the tank adjoining the Sugar-cane cultivation in the Society’s Nursery, in order that its utility may be fairly tested;

and that a minute account of the expense of construction and of working be kept as a guide for those who may be disposed to adopt the Bi-lever crane."

"Further, that the Nursery Committee and Committee on Implements of Husbandry and Machinery, be requested to co-operate in superintending its direction and application, and to report upon it."

"Proposed by the President, and *resolved*, that an estimate of the expense of erecting this machine be furnished by the Committee of Implements, before the next meeting."

REPORT.

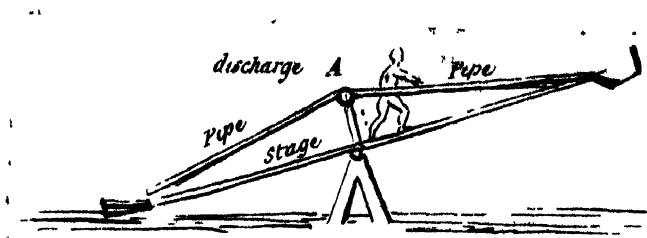
Of Implement Committee, on Mr. SANDYS' Bi-lever Crane.

Mr. SANDYS' machine for raising water is by no means new in principle. It is merely a complicated form of the French "*Bascule*," of which several varieties are depicted in BORGUIS' work, "*De Mecanique appliquee aux arts*."

The form of the *bascule* is only adapted for raising water from a very moderate depth; when carried beyond this, as in the scale marked on Mr. SANDYS' model, the great length of the levers, and the stage for suspending them, necessitate a heavy unwieldy construction; a waste of material and expence. Thus we do not estimate that a working lifter, made after the present model, would cost less than 1000 rupees, and the quantum of work it could perform, at a maximum, would not exceed 800 maunds, lifted 10lb. high per diem,* an amount easily producible at much less cost, either by the *mot*, or by a simple form of pump. The observation of BORGUIS on M. PERONNET's *bascule*, will apply to the present contrivance. "*Elle est trop pesante, trop volumineuse et d'une construction trop couteuse*."

Some of the objections might be, perhaps, removed by modifying the apparatus, uniting the two levers into one in the balance

* See Gleanings in Science, vol. i. p. 239.



principle, which would save all the supporting frame, the cylinder, the rope, &c ; but this would be a total departure from the model before us, which we are not invited to suggest. Neither could we recommend the adoption of the well known *belancier*, excepting under peculiar circumstances.

There is always a loss of time in overcoming the inertia of a large mass of material, by a weight (that of the man) which must only exceed, in a moderate degree, the water to be raised, and which bears but a small ratio to the total weight of the apparatus: again, in such an application of power, the muscular force of the arms is lost,—the continual ascending of a rudely formed stair is fatiguing, and the shocks to the system from the accelerating motion of the descending lever unpleasant, to say nothing of being plunged, at each “reprise” into the water, as the model seems to intend!

On the whole, therefore, we do not think it expedient that the Society should incur the expence of erecting Mr. SANDYS’ apparatus. At the same time, that gentleman might be invited to favour us with exact and impartial returns of work performed with the one he has set up, to confront the results with the known performance of other engines and modes of lifting water.

J. PRINSEP.
W. CRACROFT.
D. MACLEOD.

10th January, 1838.

L. — *Additional remarks on the prevention of Contagious Diseases amongst Cattle.* By H. PIDDINGTON, Esq.

[Read 13th December, 1837.]

TO JOHN BELL, Esq.

Secretary Agricultural Society.

SIR,

The Society some time ago did me the honour to print in their Transactions, a paper on the “*Bosonto*,”* the dreadfully infectious disease which at times attacks the cattle in Bengal, in which I stated that I had used repeatedly, and with great success, fumigations of muriatic acid gas to the cattle as a preservative.

I met the other day with the following corroboration of this practice, which I think well worth notice; and it is right too that the person who first devised this method, should have the credit due to it.

Translation from p. 209 of the “Nouveau cours complet d’Agriculture. 1832. Art Hygiene Veterinaire.” The writer (M. Bosc, Superintendant of the Royal Nurseries) after detailing many precautions to be taken in cases of infectious diseases amongst cattle, proceeds thus:

“In the year 8 (1799,) a disease of this kind broke out at St. Omer and in its neighbourhood: 7 or 800 bullocks or cows were carried off in the course of six months! Many cowkeepers, farmers and distillers, lost all their cattle. One distiller at St. Omer lost twenty-eight in less than a week! M. RAMMER, a first class apothecary in the military hospital, had seventeen in one cow-house, which he fed upon the grains from his distillery (his next neighbours were two cowkeepers, whose cattle were dying every day). He succeeded in preserving his cattle by fumigating them twice a day for an hour each time, with muriatic acid gass evolved within the stable upon a chafing dish

* Vide Transactions, vol. iii. page 126.

placed at one end, the doors and windows being closed. This gass seemed to annoy the cattle somewhat; they coughed and were at times restive, but as soon as the air was admitted they became cheerful, and ate with avidity. This method was employed for some time without the least sign of illness appearing amongst the cattle. They fattened as well as at any other time."

I can add nothing to this interesting extract, except that it seems from the text that these were stall fed cattle; and that they were not only kept longer exposed to the influence of the gas than I have ventured to recommend, but that they were not turned out immediately in the open air as mine were. Should any proprietor of cattle repeat the process in this country, I trust he will communicate the results to the Society. To planters, landholders and even to Government, the subject is one of immense importance.

H. PIDDINGTON.

L.I.—*To make good Butter.* By H. PIDDINGTON, Esq.

[Read 13th December, 1837.]

1. Boil the morning's milk for half an hour; about 2 seers of milk. If you have more you must boil somewhat longer. The rule is "*to boil till the milk is reduced about one-fourth,*" leaving you the remaining three-fourths; and till it is of a deep yellow colour.

2. *Stir it constantly*, both while boiling and afterwards while cooling, (which should be done in the open air), till it is *quite* cold, remember, if in the hot weather; but leave it about blood-warm in the cold weather. This stirring is a very important part of the process.

3. Leave this milk till the afternoon, covered only by a cloth tied over the vessel.

4. Treat the afternoon's milk like the morning's, and mix them both together, remembering, as I said (par. 2,) that in the cold weather the milk should be left a little warm.

5. Add to this mixture, which will be from 3 to $3\frac{1}{2}$ seers of boiled milk, about one-fourth of a chittack (about half an ounce) of *gol* or butter milk from the morning's churning. In the cold weather twice the quantity of *gol* is required.

6. In warm weather the milk may be left to set by itself with a cloth tied over it, but in the cold weather you must set the vessel containing the milk upon hot embers so as to keep it a little warm all night.

7. In the morning churu it, adding every now and then a little cold water while churning. You should have a chittack of the finest golden coloured butter, of good flavour, for every seer of milk; if you have not, you are cheated.

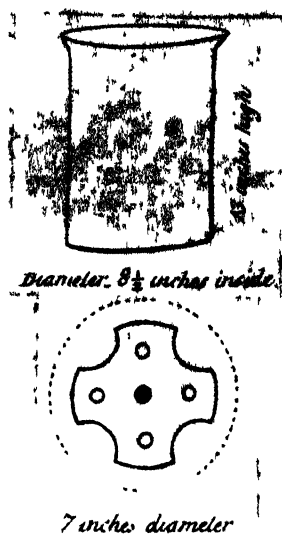
This is the process followed by the most careful khansamahs and goalas, and I know from long experience that it is an excellent one. It differs very much from the European processes, but there are chemical reasons for supposing that it is nearly the best which can be adopted, independent of its practical success; and if carefully followed, there are none of those failures which are so often a source of vexation to the master and of profit to the servant. A good rule to follow is, whenever the butter is not well made, to have all the *gol* butter milk thrown away; for tricks are often played with the milk to obtain the profit of the sale of the *gol*, which is then very rich, having all the butter mixed in it, and if passed over are the more frequently repeated.

The foregoing process will answer equally with a native churn or with the one I sent sometime ago to the Society, which the experience of eight years enables me very strongly to recommend; for with it, instead of all sorts of trickery and excuses, the butter may be made in five minutes by any servant or cooly. I add a description of my churn for those who may not have had an opportunity of seeing that in the Society's possession.

1. The *Churn* is a well varnished earthen ware (or tin) jar with strait sides and a small ledge for supporting the lid; a large English stone ware jar will do.

2. The *lid* should fit on loosely; it has of course a hole in the middle for the handle of the beater.

3. The *beater* is a round piece of well seasoned wood of the shape shown in the margin; it should be an inch and a half or two inches less in diameter than the churn.



The handle may be made as long as convenient, and natives must be told that it works up and down, for if not, they will set to work by twirling it like their own churning stick.

LII.—On Nepalese Paper. By Dr. CAMPBELL.

[Read 13th December, 1837]

TO JOHN BLLL, Esq.

Secretary to the Agricultural and Horticultural Society.

MY DEAR SIR,

In reply to your note of the 20th instant, requesting me to send you some Nepalese paper, I beg to say that I shall have much pleasure in doing so, and to suggest, that on its reaching you, samples of it be submitted to the Chamber of Commerce at Calcutta, for the inspection of the Members, and the community at large.

The accompanying copy of notes between Mr. T. C. SCOTT

and me, on the merits of the Nepalese paper, may interest your Society, as it has already done Lord AUCKLAND.

Yours truly,

A. CAMPBELL.

P. S. I shall be glad to become a member of your Society, if you will be so kind as to propose me.

To Dr. A. CAMPBELL, M. D.

Assistant Resident.

MY DEAR SIR,

I have been desired by Lord AUCKLAND, to communicate with you on the subject of the paper manufactured in Nepal; his Lordship wishes to be informed how far the paper in question is proof against insects, and in this respect available for stationary purposes, or lining boxes, &c. as well as the price and quantity at which it may be procurable.

I am,

My dear Sir,

Very truly yours,

T. C. SCOTT.

To T. C. SCOTT, ESQ.

Officiating Deputy Secretary to Government,

Calcutta.

MY DEAR SIR,

I now do myself the pleasure of presenting you with some particulars regarding the Nepal paper, in reply to your note of the 4th of October. Wherever I may appear to you not sufficiently explicit, for the satisfaction of LORD AUCKLAND on the points in question, I beg you to point out the same, when I shall endeavour to supply the deficiencies. In Mr. HODGSON's account of the manufacture of this article, published in the Journal of the Asiatic Society, in January, 1832, (copy of which is appended,) he says that, "The manufactured produce of Nepal is, for office records, incomparably better than any Indian paper, being as strong and durable as leather almost, and quite smooth enough to write on. It has been adopted in

one or two offices in the plains, and ought to be generally substituted for the flimsy friable material to which we commit all our records."

The above opinion is, I think, incontrovertible: the fibre of this paper is so tough, that a sheet doubled on itself can scarcely be torn with the fingers. The paper is so pliable, elastic, and durable, that it does not wear at the folds during twenty years; whereas, English paper, especially when eight or ten sheets are folded up into one packet, does not stand keeping in this state uninjured for more than four or five years. I have now before me some records of this office, kept on Nepal paper of 1817, as fresh at the folds, as even at the edges, and in every particular as undamaged as the newest sheet of paper to be had at Cathmandoo. There are other records of the same date on English foolscap, which have been similarly lodged and looked after, the edges of which are ragged and torn, and the folds of which are completely worn through. Twenty years, however, is nothing to boast of, in estimating the comparative durability of materials for public records, and far less is it worth mentioning, in enumeration of the qualities of the Nepal paper. The natives of this country universally assert, that the paper remains for 300 or 400 years unscathed by time, or the ravages of insects. To the truth of this assertion, I cannot bear entirely corroborating testimony, but I now have before me a copy of a Sungskrit work, (Pothi,) which bears, as the date of its transcription, Sumbut, 1744, corresponding to A. D. 1687, or 150 years ago. This work is in perfect preservation, having all that time withstood the ravages of insects, and the wear and tear of use.

I believe that the Nepal paper may be considered as a safe material for committing records to, for at least 100 years; and, probably, for twice that time. The paper is procurable at Cathmandoo in any quantity, and of various qualities. That called "Kimchat" is reckoned the best; the manufacture of "Dholoka" is considered the second best. "Kimchat" is a small village on the Tirsoolgunja River, 20 miles west of

Cathmandoo, almost entirely inhabited by paper makers.—“Dholoka” is about 30 miles east of Cathmandoo, within the hills. The common size of the sheet of “Kimchat” paper is two feet long, by eighteen inches; that of the “Dholoka” article is somewhat less. But both sorts can be had to order, of any dimensions, up to thirty feet long by twelve broad.

The present prices vary from 160 sheets, per Nepalese Rupee, to 400; or from 9 to 13 Co's. Rs. per maund. The Nepalese Rupee is worth twelve and half annas of Company's currency. The transport from Nepal to Patna would cost about 1 Rupee 12 annas per maund.

The price at Patna was last year (and I believe generally is) very little less than the Cathmandoo cost. This may appear strange, as Patna is 200 miles hence, and 60 miles of the distance is through a mountainous country; but, it is accounted for by the circumstance of there being a monopoly of the sale of paper kept up at Cathmandoo by the Government, whereas, much of the paper reaching Patna is exported from the hill manufactories direct to the plains, thus escaping the additional cost to the Cathmandoo consumer laid on by a fostered monopoly. In the event of our Government directing the use of Nepal paper in all the offices of the plains, where it could be had at less cost than Indian paper, and of its substitution for English and Indian paper for permanent records, the requisite quantity could be purchased here annually during the rains, and forwarded to the Ganges during the four cold months. But, with reference to the existing monopoly here, and to such other obstacles as might possibly be put in the way of purchase by the Durbar or its agents, of the article in large quantity, I would recommend trusting to the markets of Patna, Kessariah in Sarun, Janikpoor, Durbungah in Tirhoot, and Poorneah, for such supply as might be wanted for Bengal; and to those of Govindgunge and Alligunge in Sarun, Nichloul and Lotun in Gorukpoor, Toolsipoor, Bulrampoor, and Tandah in Oude, for what might be required for the Central and Western Provinces.

The accompanying specimens, compared in price with samples of Indian paper, will enable His Lordship to decide on their relative merits in that particular. As to their relative fitness for all office and stationary purposes, as well as for the general use of parcel packing, box papering, and every other purpose, requiring durability, firmness of fibre, and exemption from the attacks of insects, there cannot, I believe, be a moment's doubt, that the Nepal paper is an incomparably superior article, not only to Indian, but to any other known paper. Could I procure samples of the Indian papers here at prime cost, I should at once have drawn the parallel, as to the economical part of the question. You will, however, have little difficulty in doing this; and mean time I may mention, that so far as I can learn from natives of the plains here, the Nepal paper is considered all along this side of the Ganges as more economical than the Indian, except for letter-writing; for which the Cashmere paper is preferred, solely on account of its greater thinness and lightness enabling the people to reduce the expense of postage on their despatches and accounts. Sample, No. 1, herewith forwarded, costs one Nepalese Rupee, (equivalent to $12\frac{1}{2}$ annas of Company's currency) per 160 sheets, or Co's. Rs. 12 per maund. No. 2, costs 1 Nepalese Rupee, per 160 sheets, or Co's. Rs. 11 to 12 per maund.* No. 3, costs 1 Nepal Rupee per 300 sheets, or Co's. Rs. 10 per maund. No. 4, costs 1 Nepal Rupee per 400 sheets, or Co's. Rs. 11 per maund. No. 5, a large sheet, and coarse texture, admirably suited for lining boxes, packing medicines, seeds, groceries, &c., costs the same as No. 1; which latter is best suited for office records. Numbers 2, 3 and 4 are best suited for letter envelopes, rough copies of notes, and general packing. These samples have been taken out of the bazar without any choice, but they represent correctly the different kinds of the article in common use here. In Nepal, as in Europe, and elsewhere, the produce of no two bales of paper is exactly alike; but these samples are fair ones

* This is an inferior paper to No. 1, but much larger in the sheet.

for judging of the value of the article, compared with Indian, China, Cashmere, or English paper, and as already said, the paper can be had here of any dimensions and of twenty kinds to order. Lest you should prefer having bales of the paper sent hence, to trusting to the marts on the plains, I have kept duplicates of the samples now forwarded, and shall be happy if my assistance here, can be in this particular afforded to Government, or to any persons disposed to give the article a trial on a large scale.*

My personal experience enables me to pronounce it much better adapted for packing medicines in, than any of the Indian papers, or the blue or brown paper of England, used at the general Dispensary of Calcutta for this purpose. Dr. DAVIES, at Patna, informed me last year, that he found the Nepal paper far preferable to any other in the manufacture of cold drawn castor oil, and that he used several maunds a month of it in this operation, the tenacity of its fibre preventing shreds of it from mixing with the oil, as is unavoidable when using the soft paper made from cloth, or other less durable material than the inner bark of the paper tree, from which the Nepal article is manufactured.† The same gentleman is my authority on the subject of the prices of the paper at Patna, compared with those at Cathmandoo.

I have hitherto spoken only of the paper as used in its plain manufactured state. It is worth while informing you, that the natives of this country resort to a very efficient method of prolonging the durability of the article, beyond the time I have mentioned, if not to an indefinite period. The introduction of the art of (this) paper-making into Nepal, is said, by Mr. HODGSON, to be, probably, of 500 years date. The Pundits here, and other persons in the habit of reading the sacred writings, assert that copies of books made on preserved Nepaul paper,

* Say that Nepal paper of sorts may be bought here, and stored at Hajipoor, on the Ganges, opposite Patna, at from 12 to 18, and 20 Company's Rupees per maund, according to quality.

† See Mr. HODGSON's account of the paper-making process.

400 years ago, are still extant ; and that the material is in perfect preservation. This, to the full extent, may not be quite true, but from the fresh appearance of books, copied 150 years ago, I have little doubt, that for 300 years, this preserved paper may be safe—especially in a climate of the temperature of Nepal, and where destructive insects are less abundant than in India, and other hotter countries.

The following is an outline of the mode of preserving Nepal paper from the attacks of insects ; specimens of the arsenicated paper, marked No. 6 and 7, are herewith forwarded.

To preserve 100 sheets of Kimchat paper, (two feet by eighteen inches) and have it of a straw colour, take two pounds of rice, and pound it well in eight or ten pounds of cold water ; when the feculum has subsided, strain off the superincumbent solution, and place it on a brisk fire for ten or fifteen minutes, stirring it all the time from the bottom. When cool, give a coating of it with the hand to one side of the sheets of paper, hanging them in the air (shaded from the sun) until dry : when quite dry, and you wish to colour and preserve one side only of the paper,* give the other side a coating as before of the rice water, in which has been previously dissolved the following ball of arsenic—then, dry in the air as before. Take of the yellow oxide of arsenic (*Hurtal* of all the Indian bazars) 180 grains, (1 tola) and of the red sulphuret of arsenic (*Munsil* or *Munsila* of the Indian bazars) 180 grains ; grind them carefully on a marble slab, or in a mortar, and when finely comminuted, form into a ball to be used as above. When a deep orange colour is wanted, and the object is to secure the paper most effectually from insects, the solution of rice is to be made somewhat stronger, and the quantity of both kinds of arsenic is to be doubled—thus, for 100 sheets, take 360 grains of the *Hurtal*, and the same of the *Munsila*. I have examined some books, the copying of 200 years date—the paper of which had been arsenicated in the latter mode, and found them damaged only

* See No. 6.

to a very trifling extent by some insect, (supposed to be a bug) but the texture of the paper, save where actually cut by the insect, was quite sound.

For papering trunks, this mode of preservation might be advantageously adopted. The paper so treated, however, has a disagreeable smell; and besides, it is not a settled question among the people who use it, how much of the practice is referable to fashion and taste, and how much to the object of guarding against insects: many persons assert, that *without* the arsenication, the paper will last just as well as *with it*. Yellow paper is the fashionable style for transcripts of the sacred writings, without direct reference to the preservative powers of the arsenic. I am, however, inclined to think, that the arsenication is quite as useful as it is ornamental. The common objection among Englishmen to the use of Nepal paper is its roughness, compared with Indian and English paper. As sold in the bazars on a large scale this is valid, but it admits of being made as smooth as is necessary, and is so smoothed to a considerable extent here, previous to use.

The rice water prepared as above, is applied to the paper, and then dried; all that is required to give the paper a gloss and polish, is to rub it well with a glass bottle, or a smooth stone, or even a piece of close grained wood, when it becomes as even as need be. The coloured, preserved, and polished paper, costs nearly double what the plain article is noted at.

Specimen No. 8, shews the finished state of that last alluded to; and No. 9 is a rough sample of polished, but uncoloured paper.

The Nepal paper is sometimes used as a lining to house roofs. The Post Office here is thus lined, and it presents a cleanly, durable and pleasing canopy. The paper is laid on the rafters with the common flour paste. No. 10 is used as a cheap and efficient substitute for wax cloth in the packing of letter mails and bhangy parcels for despatch, by dak; this *wax paper* is prepared in a similar manner to *wax cloth*. Some years ago, I brought it to the notice of the Post Master General, in the hope

of its becoming an article of general use for Post Office purposes. That gentleman's trials of it were not satisfactory enough to induce him to use it instead of cloth. Here, however, we continue to use it, and scarce ever have a complaint against "wet mails," even in the height of the rainy season.

A. CAMPBELL,

Officiating Assistant to the Resident.

*Nepal Residency,
November 15th, 1837.*

APPENDIX.

On the native method of making the paper, denominated in Hindoostan, Nepalese. By B. H. Hodgson, Esquire, Acting Resident, Nepal.

For the manufacture of the Nepalese paper, the following implements are necessary, but a very rude construction of them suffices for the end in view.

1st. A stone mortar, of shallow and wide cavity, or a large block of stone, slightly, but smoothly excavated.

2nd. A mallet or pestle of hard wood, such as oak, and size proportioned to the mortar, and to the quantity of boiled rind of the paper plant which it is desired to pound into pulp.

3rd. A basket of close wicker work, to put the ashes in, and through which water will pass, only drop by drop.

4th. An earthen vessel or receiver, to receive the juice of the ashes after they have been watered.

5th. A metallic open mouthed pot, to boil the rind of the plant in. It may be of iron, or copper, or brass, indifferently; an earthen one would hardly bear the requisite degree of fire.

6th. A sieve, the reticulation of the bottom of which is wide and open, so as to let all the pulp pass through it, save only the lumpy parts of it.

7th. A frame, with stout wooden sides, so that it will float well in water, and with a bottom of cloth, only so porous, that the meshes of it will stay all the pulp, even when dilated and diffused in water; but will let the water pass off, when the frame is raised out of the cistern; the operator must also have the command of a cistern of clear water, plenty of fire-wood, ashes of oak, (though I fancy other ashes might answer as well) a fire place, however rude, and lastly, a sufficient quantity of slips of the inner bark of the paper tree, such as is peeled off the plant by the paper-makers, who commonly use the peelings when fresh from the plant; but that is not indispensable. With these "appliances and means to boot," suppose you take four seers of ashes of oak; put them into the basket above mentioned, place the earthen receiver or vessel beneath the basket, and then gradually pour five seers of clear water upon the ashes, and let the water drip slowly through the ashes, and fall into the receiver. This juice of ashes must be strong, or a dark like red colour, and in quantity about 2 lbs. and if the first filtering yield not such a produce, pass the juice through the ashes a second time. Next, pour this extract of ashes into the metal pot, already described, and boil the extract; and so soon as it begins to boil, throw into it as many slips or peelings of the inner bark of the paper plant as you can easily grasp; each slip being about a cubit long, and an inch wide; (in fact, the quantity of the slips of bark should be to the quantity of juice of ashes, such that the former shall float freely in the latter, and that the juice shall not be absorbed and evaporated with less than half an hour's boiling). Boil the slips for about half an hour, at the expiration of which time the juice will be nearly absorbed, and the slips quite soft. Then take the softened slips and put them into the stone mortar, and beat them with the oaken mallet, till they are reduced to a homogeneous or uniform pulp, like so much dough. Take this pulp, put it into any wide mouthed vessel, add a little pure water to it, and churn it with a wooden instrument, like a chocolate mill, for ten minutes, or until it loose all stringiness, and will spread itself out, when shaken about under water. Next, take as much of this prepared pulp as will cover your paper frame, (with a thicker or thinner coat, according to the strength of the paper you need) toss it into such a sieve as I have described, and lay the sieve upon the paper frame, and let both sieve and frame float in the cistern: agitate them, and the pulp will spread itself over the sieve; the grosser and knotty parts of the pulp will remain in the sieve, but all the rest of it will ooze through into the frame. Then put away the sieve, and taking the frame in your left

hand, as it floats on the water, and pulp smartly with your right hand, and the pulp will readily diffuse itself in an uniform manner over the bottom of the frame. When it is thus properly diffused, raise the frame out of the water, easing off the water in such a manner, that the uniformity of the pulp spread, shall continue after the frame is clear of the water and the paper is made.

To dry it, the frame is set endwise, near a large fire; and so soon as it is dry, the sheet is peeled off the bottom of the frame and folded up. When (which seldom is the case) it is deemed needful to smooth and polish the surface of the paper, the dry sheets are laid on wooden boards and rubbed, with the convex entire side of the conch-shell; or in case of the sheets of paper being large, with the flat surface of a large rubber of hard and smooth grained wood; no sort of size is ever needed or applied, to prevent the ink from running. It would, probably, surprise the paper makers of England, to hear that the Kachar Bhoteahs can make up this paper into fine smooth sheets of several yards square. This paper may be purchased at Cathmandoo in almost any quantity, at the price of 17 annas sicca per dharni of three seers; and the bricks of dried pulp may be had* at the same place, for from 8 to 10 annas sicca per dharni. Though called Nepalese, the paper is not in fact made in Nepal proper. It is manufactured exclusively (in Cis-Himalayan Bhote, and by the race of Bhoteahs, denominated (in their own tongue) Rangbo, in contradistinction to the Trans-Himalayan Bhoteahs, whose vernacular name is Sokhpo.† The Rangbo or Cis-Himalayan Bhoteahs are divided into several tribes, (such as Murmi, Lapcha, &c. &c.) who do not generally intermarry, and who speak dialects of the Bhote or Tibet language so diverse, that ignorant as they are, several of them cannot effectually communicate together. They are all somewhat ruder, darker, and smaller, than the Sokhpos or Trans-Himalayan Bhoteahs, by whom they are all alike held in slight esteem, though most

* The pulp is dried and made up into the shape of bricks or tiles, for the convenience of transport. In this form it is admirably adapted for transmission to England. See the P. S.

† The Newar language has terms precisely equivalent to these. The Rangbo being called in Newary, Paloo Sen; and the Sokhpo here spoken of is not really a different, being from the Soghpoun nomade, the name ordinarily applied in Bhote to the Mongols. But this word has, at least, a different sense in the mouths of the Tibetans, towards this frontier, on both sides of the snows.

evidently essentially one and the same with themselves in race and in language, as well as in religion.

To return to our paper-making,—most of the Cis-Himalayan Bhooteahs, east of the Kali river, make the Nepalese paper ; but the greatest part of it is manufactured in the tract above Nepal proper, and the best market for it is afforded by the Nepalese people ; hence probably it derived its name : a great quantity is annually made and exported southwards, to Nepaul and Hindustan, and northwards, to Sokya-Gumba, Digarchi, and other places in Tramontane Bhote. The manufactories are mere sheds, established in the midst of the immense forest of Cis-Himalayan Bhote, which affords to the paper-makers an inexhaustible supply, on the very spot of the firewood and ashes, which they consume so largely : abundance of clear water (another requisite) is likewise procurable every where in the same region. I cannot learn by whom or when the valuable properties of the paper plant were discovered ; but the Nepalese say that any of their books now existent, which is made of Palmira leaves, may be safely pronounced, on that account, to be 500 years old : whence we may, perhaps, infer that the paper manufacture was founded about that time. I conjecture that the art of paper-making was got by the Cis-Himalayan Bhooteahs, via Lhassa, from China ; a paper of the very same sort being manufactured at Lhassa ; and most of the useful arts of these regions having flowed upon them, through Tibet, from China ; and not from Hindustan.

Nepal Residency, November, 1831.

P. S.—Dr. Wallich having fully described the paper plant, it would be superfluous to say a word about it. The raw produce or pulp (beat up into bricks) has been sent to England, and declared by the ablest persons to be of unrivalled excellence, as a material for the manufacture of that sort of paper, upon which proof engravings are taken off. The manufactured produce of Nepal is, for office records, incomparably better than any Indian paper, being as strong and durable as leather almost, and quite smooth enough to write on. It has been adopted in one or two offices in the plains, and ought to be generally substituted for the flimsy friable material to which we commit all our records.

~~True Copy~~ A. CAMPBELL.

PROCEEDINGS
OF THE
AGRICULTURAL AND HORTICULTURAL SOCIETY
OF INDIA.

REPORT.

Report of the Sugar Committee, on the motion brought forward by Mr. BELL, at the July General Meeting of the Society, with a view to encourage the importation of Otaheite Sugar-cane for distribution throughout India.

In accordance with the Resolution passed on the 12th July, a Meeting was convened at the Society's Office, Town Hall, on Wednesday morning, the 3d August, when ALEX. COLVIN, Esq. was unanimously elected Chairman of the Standing Sugar Committee.

Present.

A. Colvin, Esq. in the Chair.

W. Storm,

D. Hare,

G. U. Adam,

A. Muller,

J. W. Masters,

John Bell, Esqrs.

The Secretary informed the Committee, that Mr. N. Alexander, who was prevented from attending, by being on the Grand Jury, had called upon him, to explain his intention to have opposed Mr. Bell's suggestions, on the grounds of experiments made by Messrs. Henley and Blake, the results of which Mr. Alexander said, were unfavourable to the encouragement of the Otaheite, in preference to the Indigenous and China Canes that were thought to yield more saccharine matter, than the Otaheite kind, while they did not exhaust the soil in the same ratio.

The Committee, after giving their best consideration to the objections offered by Mr. Alexander, do not think them based on sufficiently accurate data, to warrant their adoption, as many circumstances might have combined to lead the parties making such experiments, to arrive at wrong conclusions; and have, therefore, agreed to the following Report.

REPORT.

Your Committee cannot allow the opportunity which presents itself, at the commencement of their labours, to pass without an expression of regret that so little has yet been effected in the way of introducing a superior cane through India, but they cannot withhold their humble tribute of praise, which is due to the persevering zeal of Major Sleeman, who, from a small supply of Otaheite cane, brought by him from the Mauritius in 1827, has now raised a nursery at Jubbulpore which feeds the surrounding districts.

To the exertions of Col. Colvin, the Upper Provinces are likewise indebted for the introduction of this superior product, and the Society of Lucknow boasts of an extensive nursery of the same description of cane.

The comparatively slow progress of its introduction into the Lower Provinces, may fairly be imputed to circumstances over which this Society has no controul; since its attention to the importance of the measure may be traced in its Report upon experiments carried on at Akra Farm, and the distribution of cane produced there, is evidence of the anxiety felt to give it a fair trial.

The average weight of middling size Otaheite cane grown at Akra, was 9 lbs. each, while that of the common dessee cane was 1 lb. each.

The experiments further showed that excellent rattoons were produced from the stoles of the first year's plant, and this is a very important point to be kept in view, when placed in juxta position with the stunted indige-

nous cane, which requires a new rotative crop every year at an immense waste of labour and irrigation ; and it is a singular coincidence, that the same prejudice existed, not very many years ago in the West Indies against the introduction of Otaheite cane in the Slave Islands, under a similar impression, as that entertained by Messrs. Henley and Blake, of its *watery* qualities, until from actual experiments made on a large scale, by one or two public spirited individuals, the spell was broken, and now nothing, save the "Otaheite" waves triumphant in every Island.*

That such will be the case, a few years hence in India, your Committee entertain very sanguine hopes, and under this conviction, and with a view to bring about this consummation as early as possible, they would recommend the adoption of Mr. Bell's suggestions in the amended form now submitted.

Proposed. 1st. That one rupee be offered for every full grown Otaheite cane, or for every eight feet of cut cane, that may be imported by sea from the Mauritius or other place, beyond the continent of India, within the next eight months from this date, and that it be optional with the Society to limit or extend their purchases to, or beyond 1,000 canes, the money for such canes to be paid, under a certificate of the Agricultural Committee, as to their vegetating powers, on examination immediately after arrival at the Honourable Company's Botanical Garden.

Proposed. 2nd. That in addition to the premium of one rupee for each cane, the *gold* medal be awarded to any individual who shall first import, as above, two hundred full grown full length Otaheite canes, or a quantity of cut packed cane, equal to 1,600 running feet, within the period notified in the first proposition.

Proposed. 3d. That in addition to the premium of one rupee for each cane, the *silver* medal be awarded to any individual who shall import as above the second two hundred whole canes, or cut canes (packed) equal to 1,600 running feet, within the period above described.

Proposed. 4th. That a premium of two thousand rupees and the gold medal, be awarded to any cultivator who can exhibit, on or before the 1st January, 1839, fifty regularly planted Bengal beegahs of Otaheite Sugar-cane in the best condition and most advanced state of cultivation of at least six months standing, in any part of Bengal ; each plant to be

* For examples of success in India, see Transactions, vol. iii. p. 42 (56 para. 14) 57, (72 paras. 1, 2, 3.)

four feet apart, and laid in holes 18 inches deep, after the West India plan of cultivation, on condition that the first year's produce be offered to the Society for purchase, and on condition that the cultivator allow the stoles to remain, the ratoons produced from such stoles being offered for sale to the Society, at a price not exceeding two pice per full grown ratoon.*

Proposed. 5th. That it shall be incumbent on competitors to transmit at their own expense, not less than twenty of their best canes, to the Secretary, accompanied by a certificate under the signature of the nearest authority, on honour, that the cultivation is so many beegahs; and the decision of the Sugar Committee, will be received by the Society, in evidence of the successful candidate.

Your Committee have been induced to confine competition to Bengal, as it is understood that the Otaheite cane has, through the several channels, already adverted to, been firmly established in the Upper Provinces, including Goruckpore.

In conclusion, adverting to a letter, read at the last General Meeting of this Society, to the address of Mr. Willis; your Committee, while they regret that any feeling like jealousy should exist on the part of the Mauritius planters, to which is attributed the difficulty of obtaining supplies from thence, do not regard this feeling with the slightest apprehension as to the ultimate successful introduction of the Otaheite cane, and they are disposed rather to attribute the difficulty to some other cause, for it would be folly in the Mauritius planter to exhibit any dread of competition from India, by simply denying us a few plant canes, when he is aware, or at least he may now learn from this Report, that we are independent of foreign supplies, but hold out those Premiums only to induce an *early* consummation of what must, in a few years, take place, without further assistance from without.

Lastly, your Committee desire to recommend that their propositions, based on the suggestions of the Secretary, be adopted without any more delay, as notice cannot be longer protracted with any fair prospect of obtaining plants in season, and within the period prescribed; and that the

* Or in event of the above not being claimed, the sum of 1,000 Rs. with the Silver Medal be awarded for any quantity of cultivation not less than 25 beegahs, on the same terms or conditions as above, preference being given to the largest extent of cultivation.

Secretary be requested to annex to the series of resolutions, a memorandum pointing out the mode of packing, &c. which has been, on actual trial, found best.

A. Colvin.

A. Muller.

G. U. Adam.

J. W. Storm.

J. W. Masters.

David Hare.

John Bell.

Proposed by Dr. Wallich, seconded by Sir E. Ryan, and
Resolved, that the above Report be adopted.

Proceedings of a Committee for the Improvement of Cattle.

At a Meeting of the Agricultural Committee, convened at the residence of Dr. Wallich, on Friday evening, the 10th March, 1837, for the purpose of considering certain matters, relating to the general operations of the Society.

Present.

N. Wallich, Esq. M. D. Wm. Storm, Esq. John Bell, Esq.

The Secretary informed the Meeting that he had received from the Serampore Press, 100 separate copies of the Secretary's Annual Report, and suggested that a copy be forwarded to each station along with the series of Agriculture queries already printed and recommended to be circulated.

Resolved. That a copy of the Annual Report be added to each dispatch.

The 3d Resolution of the Agricultural Committee of the 11th March, 1836, was then read, which had for its object an intended exhibition on the 15th March, 1837, for the encouragement of late Vegetables and Strawberries.

Resolved. That with reference to the irregularity of the season, and to the general appearance of the bazar, it is not expedient to have the exhibition as proposed.

The Secretary brought before the Committee for deliberation the subject of a motion from Mr. Storm, viz.:

That measures be adopted by the Agricultural Society to improve the breed of cattle and sheep for their wool, in India, by crossing them with those of other countries.

This object appears to the Committee to come fairly and legitimately within the sphere of the Society's operations, and the only apparent objection to recommending it for immediate adoption is the apprehension, that notwithstanding the flourishing state of the Society's funds, the maintenance of an experimental breeding farm would absorb more of the Society's funds than would be prudent, with reference to the many other objects of importance which will require their solicitude and pecuniary support as the sphere of their operations becomes extended ; and since considerable expense must, in the first instance be incurred in importing choice cattle and sheep from England and America, New Holland, and the Cape, the Committee would wish that the farm might be conducted under the immediate superintendence of a Committee selected by the Society.

The Committee, however, viewing the subject, as one of great importance to the Agricultural interests of India, entertain a hope, that a proper representation being made by the Society to Government will secure for them its powerful aid and co-operation ; and beg leave to recommend that Government be applied to without delay, and further, that the Honourable the Court of Directors be solicited to countenance the exertions of this Society, in carrying this design into effect.

The Committee conceive that the first step to be taken is to secure, either by renting or loan, a parcel of ground, of an extent not exceeding — beegahs, situated so as to command a good supply of water and pasturage.

The Committee are not prepared to suggest any fixed spot for the establishment of a farm, beyond drawing your attention to a parcel of ground, situated between the Honourable Company's Botanical Garden and Bishop's College, which appears to possess several advantages in point of shade, supply of water, &c. which might probably be obtained from the Government rent free.

The next point would be, the erection of suitable sheds and stalls according to the plan that may be suggested and approved by the Farm Committee.

This done, your Committee would recommend, that a few select specimens of country cattle be secured, through the assistance of gentlemen who may be considered competent judges, and that sheep from Jeypore and other parts be also procured. The Committee doubt not that Col. Skinner and Major Parsons would favour them with the benefit of their

experience and assistance in procuring for them the best breeds of cattle in Upper India.

The Report of a former Committee on the subject of introducing the high-wheeled cart of Madras,* does not go far to warrant the success anticipated in the present, although nothing is there set forth to prove that cross breeding would not improve the present degenerate cattle throughout the Lower Province.

That Committee appeared to lay great stress on the importance of introducing (with a view to improve the Bengal cattle) superior grasses, as guinea grass, &c. a step in which the present Committee perfectly concur, although they think that the question is of sufficient importance to demand from the Society, some more solid proof, than mere assumption, that the cattle of India are not susceptible of improvement by crossing with *foreign* cattle.

Within the last fifty years a vast improvement has taken place in the cattle of the Hebrides, and this has been effected through the indefatigable exertions of a few wealthy landlords.

There the food and provender were no better than in India, and the cattle small and meagre. By importing superior bulls from different parts of Scotland, and at the same time introducing a better system of husbandry, the cattle are now equal to many of the best breeds in England.

The Committee are of opinion that both husbandry and cattle in India may be improved at the same time, by holding out the one as a premium towards the advancement of the other. Thus the Society having established a farm for improving the breed of cattle and sheep, might very properly offer cattle reared by them, as premiums to such Agriculturists as may, within given periods, be able to exhibit a certain extent of land cultivated in guinea grass, or other general crops, as Mungel Wurzel, &c. the Society undertaking to supply them with seed.

Referring to the Report of the Committee on the subject of the high-wheeled carts of Madras, it may seem singular to find the name of one of the Members of the present Committee advocating an apparently opposite side of the question; but it must not be overlooked that the subject now under consideration, is altogether different, as embracing

* See vol. ii. page 212.

interests of Agriculture generally, while the former had reference to that of the public service in particular. Thus, it was necessary in order to introduce the high-wheeled cart as recommended by Lord Wm. Bentinck, to secure strength and great substance to draw it; and as in the present degraded state of Agriculture the improvement of the Bengal cattle, by crossing them with the larger breeds of Nagore, Hurrianah, or Sindé in the absence of suitable pasturage, was deemed inexpedient for a *special* purpose, it by no means follows, that for general purposes of husbandry a better breed may not be successfully introduced; and the present Committee are sanguine that this result will be obtained by importing choice cattle from the most approved breeds of foreign countries, and in this view they are borne out by the single fact that although English cattle do not thrive in India, the breed between an English Bull and the Bengalee Cow is far superior to the dam in point of size, substance, docility and flavour, as regards the meat; whereas the experiments upon which the former report was formed, was wholly confined to crossing different breeds of Indian cattle, as will be seen from the Memorandum furnished by Major Parsons, and which being an interesting document for reference, the Committee beg to recommend its publication with their Report, should it be adopted by the Society.

The Committee would deem their Report incomplete, did they omit to direct the attention of the Society to the introduction of *Mules* in India, for burthen and draught.

To any one who has given the subject of Indian rural economy the least attention, the great mortality in horned cattle must have forcibly struck them; and this cannot be better elucidated than by a reference to the number of raw hides annually exported from Calcutta, nine-tenths of which at least, are stript from cattle that have perished from disease or starvation. An interesting enquiry therefore suggests itself, whether a more valuable breed of horned cattle cannot be introduced for the butcher and the dairy, which would enable India to create an export of superior hides and tallow, while an animal more hardy and equally economical as regards food might be substituted for burthen and draught.

The Committee do not mean to recommend the use of *Mules* produced from the miserable samples of the Aas, to be met with every day in the suburbs of Calcutta; but should the Society deem the experiment judicious, they would recommend that two or three Stallion asses

be provided from the Island of Gozo,* which on arrival, might be kept at the farm, and with a few broken down brood Arab mares would be found to produce Mules of the best description.

The question is one of importance at present, since the attention likely to be paid to Sugar in this country, will demand more efficient sort of Draught Cattle than the miserable oxen now employed ; and for carrying cane, no animal is better calculated than the Mule.

It may be argued that the difficulty of maintaining an efficient stock of animals incapable of reproduction, would be a bar to the idea, but it is only imaginary, since the life of a *working* mule under *common* care, averages from 30 to 40 years, and the stubborn habits for which they have credit, are more proverbial than real.

N. WALLICH,
W. STORM,
JOHN BELL.

Proceedings of the Committee of Papers held at the same time and place.

The Secretary brought to the notice of the Committee the delicate situation in which he felt himself placed, in reference to a resolution passed at a General Meeting on the 12th August, 1835, which carried with it the necessity of expunging the names of 33 Members, who had failed to pay up their arrears of subscription. He was anxious to have the question settled, as the number of elections lately proposed included one or two of the names referred to in that resolution; and he held it his duty as Secretary to bring this to notice, as the re-election of old non-paying members, rendered that resolution a dead letter; but while he brought this circumstance to the notice of the Committee, he begged to be understood, as offering no opposition to the re-election of members; but simply that he might be exonerated from future censure, in allowing re-elections to take place while members were under the imputation of being defaulters, and consequently disqualified from being re-elected, under the resolution above referred to.

* Some of them are 14 hands high.

The Secretary explained that with reference to the undecided and irregular manner in which members had formerly been called upon to pay their subscriptions, some allowance might possibly be made, as in all probability, had they been *regularly* called upon for payment, no such arrears would have accumulated.

Mr. Storm argued on the same side, alluding to the limited circumstances of many useful members, who would not grudge paying a small sum quarterly, when they knew that they would be called upon; but when quarters and sometimes years were allowed to run on, the demand made for a large sum, was inconvenient and annoying.

Dr. Wallich was averse to trampling upon resolutions passed at a General Meeting, and considered that the least reparation an old member could make, would be to pay up his arrears, (unless he could shew that he had duly notified his intention to resign) before he could be re-elected, otherwise he thought there was little utility in passing resolutions, that might be overturned to suit the convenience of members to the manifest injury of the Society, and which would appear to be an act of injustice to those who had steadily continued to pay their subscriptions; and he thought it a dangerous precedent to introduce.

After some discussion it was proposed and agreed upon to submit the question at the next General Meeting, *before the Ballot went round*, with a recommendation that an act of oblivion be passed on bye-gone defaulters, on the ground that irregularity in demanding subscriptions quarterly might be received in excuse.

Proposed, 2ndly. That members who fail to pay up their subscriptions after the above resolution is passed, shall not, under any circumstances, be eligible in future; and that the names of defaulters coming under this resolution in future be hung up in the Society's rooms, and that it shall be the duty of the Secretary when names, thus situated, are proposed for re-election, to bring them at once before the meeting.

The Secretary brought to notice a motion passed at a General Meeting on the 8th February last, authorizing a certain sum (as far as might be recommended by the Committee of Papers) to be laid out in the purchase of useful Agricultural Books of reference, and wished to know what sum might be allotted for such purpose.

Resolved, That the sum of 600, six hundred Rupees, be set apart annually for this purpose, and that no more be expended without a special reference to the Committee.

Resolved, That the Secretary be allowed to purchase books to that extent, and that the selection be left to his judgment.

Proposed, With reference to the discussion which arose at the last General Meeting on the subject of electing Col. J. Colvin, an honorary member, and to the different views entertained by members of the interpretation of the existing rules of the Society;—that those rules be submitted to the Committee of Papers for revision, and such amendments as they may deem expedient, and the result of their suggestions be read at a General Meeting, and adopted, if approved.

Proposed, That new members shall be entitled to a copy of the Society's Transactions that may be published after their admission, but not to previously published volumes or parts, unless they pay for the same.

N. WALLICH.

W. STORM.

JOHN BELL.

A meeting of the Agricultural Committee took place at the residence of Dr. Wallich, on Tuesday evening, the 2nd May, 1837.

Present.

N. Wallich, Esq. M. D.

Wm. Storm, Esq.

John Bell, Esq.

With reference to the recommendation which came before the Society at the last General Meeting, from the Agricultural Committee on the subject of Mr. Storm's motion to endeavour to promote improvement in the breed of cattle and sheep in India generally, and particularly in Bengal, the Committee now beg leave to *move*,—that their suggestions be adopted, and that the Secretary be instructed to apply to Government for a grant of the land adverted to in their report, situated to the westward of Bishop's College, and to the eastward of the Honourable Company's Botanical Garden, Dr. Wallich having intimated that as far as he is concerned, he is not aware of any objection to the

ground being detached from the Botanical Garden for the purpose stated to the Society, provided Government feel disposed to grant their sanction for its appropriation; and the Committee feel desirous that resolutions be passed at the next meeting* to carry their design into effect, and further that they be authorized to adopt measures for procuring cattle and sheep from such countries and of such breeds, as the Committee may deem expedient; the Committee entertaining a confident expectation, that the direct aid of government, as expressed in their report, will not be withheld on a proper application being made.

The Committee have the pleasure to report favourably of the Nursery in general, and particularly of the successful application of lime as a manure, which was observable in its effect upon the Sugar-cane plants that had been received from Bombay in a weak and dying state, and were now shooting forth in the greatest vigor, in soil prepared with lime. Dr. Wallich recommended that the produce of these cane plants, should on no account be disturbed, or distributed to applicants for at least 18 months. This suggestion was offered with reference to the great demand at present for Otaheite cane, and under an impression that one break in the Nursery would be followed by another, until our present limited means were wholly exhausted; whereas, by husbanding the present nucleus, we could 18 months hence meet all demands, and at the same time reserve an adequate supply for all future wants.

Resolved, That Dr. Wallich's motion be adopted.

A large extent of ground has been added to the former limits of the Nursery, and dug up ready to receive whatever may be sent.

W. STORM.
JOHN BELL.
N. WALLICH.

Committee of Papers.

The Committee considered the resolution passed at the last General Meeting, regarding the revision of the Society's rules, but deemed it expedient to postpone their labours on this subject, until the Report of

* Vide the Meeting in May.

the Committee appointed to draw up their views in respect to awarding medals, shall have been adopted.

W. STORM.
N. WALLICH.
JOHN BELL.

Circular.

To N. Wallich, Esq. M. D. V. P.
C. K. Robison, Esq. V. P.
W. Storm, Esq.
H. Walters, Esq.
N. Alexander, Esq.
C. Huffnagle, Esq. M. D.,

Members of the Sub-Committee appointed at a General Meeting of the Agricultural and Horticultural Society of India, on Wednesday, the 10th May, 1837, to reconsider the suggestions of the Agricultural Committee in regard to the establishment of an experimental breeding farm, having for its object the improvement of cattle and sheep.

Gentlemen,

Being sensible how fully occupied each Member of this Committee is with his public and private affairs, I consider that the most convenient way to gather the sense of the Members, will be to circulate the Report of the Committee for their attentive perusal, and any remarks they may be disposed to make.

2. As the documents pass, the several Members will, perhaps, be kind enough to fix upon a day to meet at the Town Hall, for the purpose of discussing generally the various suggestions, individually offered. Unless some arrangement of this kind be adopted, I fear we should only meet to meet again.

I have the honour to be, Gentlemen,

Your obedient and humble servant,

JOHN BELL,

Secretary,

Agricultural and Horticultural Society.

Town Hall. Calcutta, 17th May, 1837.

I entirely concur in the sentiment expressed by Mr. Bell in this circular, and shall be happy to meet the Members of the Committee on the afternoon of any day, or in the morning, (except on Mondays and Wednesdays). As the circular has been brought to me first, I beg leave to suggest, that a Meeting be held at least a week or ten days before the Society's next General Meeting, which will, I believe, take place on the 15th of next month. Would it be convenient to fix Monday, the 5th, or Wednesday, the 7th, at 4 o'clock in the afternoon, at the Town Hall, for our Committee Meeting?

My opinion on the importance and practicability of the measure which is to be discussed, is so fully expressed in the accompanying reports, that I need not make any further observation here, except that it remains unaltered and unabated.

N. WALLICH.

19th May, 1837.

I will attend any afternoon at 4 o'clock which may be fixed on. It appears to me, from a hasty perusal of the report, that no calculation of the expense of this experiment has been made, and I fear it will be found on investigation, so great, that the Society will not have the means of establishing it on a scale of sufficient magnitude to be useful to the country.

To make the experiment practically useful, there must be as much attention paid to the laying out the ground, and the erection of improved sheds and buildings, as to the breed of cattle. I cannot say I approve of the farm being across the river. It places it beyond the reach of the members of the Society, and of the butchers, &c., who should be invited to attend, and be shewn the advantages of improved housing and feeding.

In a society so poor and so prejudiced as that of the Indian farmer, I am inclined to think that the best and simplest way of introducing improvement and overcoming prejudice, will be for the Society to start in their experiments from the very position in which they find the particular object of their attention, and gradually lead the native on to discover from demonstration, the advantages to be derived from the proposed improvements. Instead of at once introducing a new breed of cattle, I should recommend, that the first experiment be made in some cattle purchased from the butchers and sheep feeders. Invite them to attend

and see experiments on improved feeding, housing and care. Let them see what a quantity of food may be reared from Guinea grass, &c., and if they find, that they can improve their own fortunes by adopting these changes, I think they will do so, with more benefit to the country than can be derived from the farm proposed. A liberal distribution of prizes in addition, will give them a stimulus.

I have not made a calculation, but I consider that 40,000 Rupees would be required, to establish such a farm as is contemplated, on a scale and in a style such as would make it really useful, and I am of opinion in the end it would not answer the purpose so well, as liberal prizes.

N. ALEXANDER.

I shall gladly meet the Committee on Monday, the 5th June, at 4 o'clock, as suggested by Dr. Wallich. I agree with Mr. Alexander, that to do the thing at all, would require funds much beyond the ability of the Society. Neither do I think that Government could assist, as breeding farms upon a large scale, have (as I am informed,) been given up by it, being considered failures. So far as medals will do good, I would encourage the experiment.

C. K. R.

I will attend on Monday, 5th June, at 4 o'clock.

I differ entirely with both Mr. Alexander and Mr. Robison. The former seems to view the matter as if the cattle and sheep were to be reared for the use of the butcher, whereas the original object was to introduce cattle of more bone and substance for the use of the Agriculturist, and sheep from N. S. Wales, the Cape and Europe for the sake of the wool.

With regard to offering premiums, it is a distinct subject, and may be brought forward hereafter, but we should at present confine ourselves to the report submitted to us. As to the expense in the absence of all experience in the matter, it is as easy to put down 40,000 as any other sum, but I conceive the expence depends entirely on the parties having the management, as they should only order stock according to their means, and in a few years from the sale of the cattle and sheep, I expect we shall realize a handsome profit on the experiment, and benefit the country by introducing a valuable export in the article of wool.

W. STORM.

On the importance of encouraging the improvement of the breed of

cattle and sheep, and other Agricultural stock in this country, there can be but one opinion. The difficulty is, to hit upon the *best means* at accomplishing that object.

I concur with Messrs. Alexander and Robison in thinking that an experimental farm yard, to be of any real utility, would be required to be conducted on a scale and at an expence far beyond the means of the Society.

I concur with them also in opinion, that should the plan be tried, a site should be chosen on *this side* the river, within reach of the principal native landowners, resident at the Presidency, and of persons connected with the supply of the markets and bazars, as well as of those members of the Society who, from time to time, may take an interest in the establishment.

In England, Agriculture in all its branches is a science ; and is followed as a profession by a class of persons who make it the business and study of their lives to improve the produce of their land and the value of their live stock. Hence the immense population, so small a superficies of generally speaking indifferent land, has been made to maintain, and which has not yet reached its achme.

In this country we are in the very antipodes of England, in all these matters. Here we have an unbounded surface of generally speaking rich land, which almost spontaneously produces all that is necessary for the sustenance of its teeming population. Of capital there is no want ; of labourers there is no want ; of flocks and herds there is no want ; but there is a *want of improvement* in every thing. There is a want of a race of zealous, enterprizing, professional Agriculturists capable of seizing on all these natural advantages, and turning them to the best account.

The means resorted to in England and other countries to stimulate the energies of Agriculturists, has been the offer of considerable bounties and premiums, and the award of honorary medals by Agricultural Societies.

No one doubts the fact that *self-interest* is the best spur to improvement : that *cent-per-cent* is the *grand improver* ! But have the efforts of Societies, using the means above adverted to, been *nevertheless useless* in England, not in Agriculture only, but in promoting the sciences

and fine arts also? Undoubtedly *not*, nor will the same means be found useless and ineffectual in British India. Let cent. per cent. then, work its own way. But let the *encouragement* and approbation of a body of intelligent and influential men, united together for the promotion of national improvement, be *also* brought to bear upon the intelligence, the ingenuity, and the industry of the country, and if the rewards such a body have to offer, are not so *lucrative*, they will at least convey with them a *value in honour*, which it will be beyond the power of cent. per cent. to *purchase*! While the one, indeed, is but the offspring of *selfishness*, the other, contemplating the amelioration of the general weal, enlists the sympathies of our fellow men, and some of the nobler virtues on the side of improvement.

Apologizing for this digression, I will now observe, that under the circumstances of this country, to offer premiums and medals only, will not be enough; because the Zemindars are *not able to procure* improved stock to breed from. The Society imports and distributes foreign seeds. We must also undertake to import and distribute foreign breeding stock.

And this may be accomplished; 1st. By indenting for the stock required, as Merino rams, bulls, male asses, &c. &c. and importing them at their own cost and risk; or,

2. By offering *bounties* on the importation of the stock required, the importer being bound to place the stock at the disposal of the Society, on reasonable terms.

The second plan would be the best for adoption on various accounts; and I see no difficulty in its accomplishment.

Then comes the question; what is to become of the stock when imported?

To which I would reply, sell them as soon as possible, at the *lowest* remunerative upset price*, either by private bargain, or public sale.

Meanwhile, let the *intentions* of the Society be made known from Saugor point to the Cow's-mouth; and let Agriculturists, Native and European, be invited all over India, to turn attention to the improvement of stock. There is no doubt, I think, the Society's rams, bulls, &c. would

* Exclusive of the *bounty*.

be bought up immediately on arrival, by parties located in positions favourable to the growth of wool, the breeding of cattle, &c.

To complete the scheme, let handsome premiums and medals of gold and silver be awarded to the *best produce* from the Society's imported stock; not only to the best *animals* for draught and farm work, but to the best wool, best salt provisions, best carcass, with respect to weight, fat, &c. &c.

A treatise on the care and treatment of live stock, with remedies for the most common diseases to which they are liable, written in plain language, would be most valuable hereafter;* a premium for such a work might be offered. I may mention, to shew how *important* the subject is, that the Revenue report from Arracan for the last year 1835-36, assigns the death of 16,787† head of Plough Buffaloes and Bullocks, during that and the two preceding years, as the cause of a considerable falling off in the land revenue, and asserts that a considerable quantity of the current year's cultivation will be conducted in consequence by spade or rather hoe husbandry. How a very little European knowledge on the diseases of cattle and their remedies, might have averted this loss to the people and to the state!

I have the pleasure to submit an account of the last anniversary meeting of the Bath and West of England Society for the encouragement of agriculture, arts, manufactures and commerce, held in December last, in which the nature of the premiums and bounties awarded to the live stock exhibited, will be observed, as well as the descriptions of stock encouraged.

H. WALTERS.

25th May, 1837.

I am *sorry* I have but little experience in these matters. However, it appears to me, that some of the gentlemen who have here recorded their opinions, have adopted a wrong idea, regarding the capital required for commencing this very important undertaking.

For an extensive establishment a large outlay would, indeed, be necessary, but the "breed of Cattle in India" might be greatly improved by a

* Or why not now?

† Ms. 1195-4,358 1197-6,188 119-6,241 or 16,787 A. D. 1835-36.

much more economical mode of procedure. I would offer, as my humble suggestion, that the Society, as an experiment, begin by importing a certain number of bulls, rams, &c. *not for sale*, but to be kept by them in such situations as to render them available. The natives would gladly take advantage of such opportunities, and we might hope that, especially the miserable *draught* cattle now employed, would give place to well formed oxen, possessing bone and sinew. The same remark might also apply to the breeding of horses, and the diminutive race of the country become gradually extinct.

The animals would be more likely to live, if imported from warm climates; say, the southern parts of Europe, or the warm latitudes of America. Selections of fine cattle might be made at Rio de Janeiro.

I do not believe we should ever succeed well with wool; I fear it would degenerate, and become hairy. Premiums *in money* should, I think, be offered as an inducement for the native to take proper care of the food and stabling, for the poor brutes he may be possessed of.

20th May, 1837.

CHARLES HUFFNAGLE.

To N. Wallich, Esq. M. D.
H. Walters, Esq.
N. Alexander, Esq.
W. Storm, Esq.
C. K. Robison, Esq.
C. Huffnagle, Esq. M. D.

Gentlemen,

I beg leave to submit the draft of a Report of our proceedings on Monday last, which, if approved, be so good as sign, and return without delay, that I may circulate a fair copy for your respective signatures, before the next General Meeting, which will be on Wednesday morning.

I have the honour to be,

Gentlemen,

Your most obedient servant,

JOHN BELL, *Secretary*.

Town Hall, Calcutta, 8th June, 1837.

Report of a Special Committee appointed at a General Meeting of the Agricultural and Horticultural Society of India, on the 10th May, 1887, to re-consider certain suggestions offered by the Agricultural Committee, on the motion of Mr. Storm, to improve the breed of horned cattle and sheep in India generally, and particularly in the Bengal and Agra Presidencies.

The Agricultural Committee having left the computation of expense, as an after consideration, their view being to arrest the attention of the Society to the utility of the measure, the President proposed, and it was

Resolved, That the Reports of the Agricultural Committee be again submitted for further consideration, and that Messrs. Walters, N. Alexander, C. K. Robison, and Dr. Huffnagle be requested to join the original Committee.

In conformity with the above resolution, a meeting (consisting of Messrs. Walters, Alexander, Huffnagle, Storm and Bell) was held at the Town Hall, on Monday afternoon, June 6th, to consider the minutes of the Members on the subject for which they had assembled, and for which purpose the former reports had been previously circulated by the Secretary.

The question of expense likely to attend an experiment of this nature, seems to be that upon which your Committee find it most difficult to decide, and as by some members it has been estimated at an amount far beyond the means of the Society; those who are at issue on this point are disposed to concede their opinions for the present, in favour of any measure, which will attract attention to the subject.

Under this explanation, your Committee think that the object may be, perhaps, attained by offering medals and premiums, and would, therefore, suggest the following resolutions to the Society:

1st. That medals and premiums be offered for the most approved *horned cattle* and sheep, imported from abroad, after the publication of this resolution.

2d. That medals and premiums be given for the best specimens of horned cattle and sheep, as well as the produce of importing cattle, ex-

hibited in Calcutta, for which purpose a shew of cattle will be invited on the plain, opposite the Town Hall, on the morning of the 1st January.

3rd. That the Secretary be instructed to give this latter resolution the utmost publicity, by advertizement and posting notices in every bazar, and throughout the surrounding villages by the beat of tom tom.

I was not able to attend at the meeting of the Committee, but I concur in their resolution.

N. WALLICH.

N. ALEXANDER.

CHARLES HUFFNAGLE.

W. STORM.

JOHN BELL.

I have no hesitation in concurring in the vote to bestow medals and premiums, (according to the means of the Society,) upon such as shall be most successful in improving our horned cattle and sheep; but our report should state distinctly what these medals and premiums are to be, that the Society may either sanction or object to them; for it must be borne in mind, that so soon as this Committee have rendered their report, they are *functi officio*, and cannot, unless re-appointed, again consider the matter; and even then, they must submit their proposals to the Society, at a General Meeting, for sanction.

C. K. ROBISON.

I concur with Mr. Robison in thinking that we ought to submit something *more definite* to the General Meeting; I think also a resolution to the effect, that medals and premiums shall by and bye be awarded to the best stock produced, and the stock imported in consequence of the Society's premiums, should be passed. The terms of this latter to be decided hereafter; this to complete the general plan. As to the rate of premium on importation, supposing we propose *500 rupees for each Bull, 100 for each Ram, and a Gold or Silver Medal, in addition to the party who may

* Or 500 for the first, 300 for the second, and 100 for all above.

import, say 3 Bulls and 6 or 8 Rams at the same time. I merely throw this out to invite discussion and amendment.

H. WALTERS.

I would prefer giving medals only to those who produce Bulls and Rams, and the money premiums of say, 500 to whoever imports 3 Bulls, and 300 to whoever shall import 10 Rams. I approve of the after prizes to stock reared here.

C. K. ROBISON.

Proceedings of the Cattle Committee.

In conformity with a resolution passed at the last General Meeting of the Society, on 14th June, 1837 ;—That the report of the Cattle Committee be returned for amendment. A Meeting consisting of Messrs. Robison, Walters, Huffnagle, Alexander and Bell, was held at the Town Hall, on Thursday morning, July 6, when the following propositions were agreed to :

For Cattle imported between 1st January, and 31st December, 1838, the show to be held on 1st February, 1839.

- 1st. For the best imported Bull (excepting the produce of New Holland) not less than 2 years old, a premium of 500 Rs. and the Gold Medal.

For the second best ditto ditto, a premium of 400 Rs. and the Silver Medal.

For the third best ditto ditto, a premium of 300 Rs.

- 2nd. For the best wooled Ram, not less than 2 years old, a premium of 200 Rs. and the Gold Medal.

For the second best ditto ditto, a premium of 150 Rs. and the Silver Medal.

For the third best ditto ditto a premium of 100 Rs.

- 3rd. For the best produce of imported Cattle, half the aforementioned premiums, and the Gold and Silver Medals, will be given on the 1st February, 1840.

- 4th. For any person who shall shew a cultivation of 20 well planted beegahs of the best guinea grass, on or before the 1st January, 1838, either in Calcutta, or in the Mofussil, 200 Rs. and the gold Medal.

For 10 Beegahs of ditto ditto, 100 Rs. and the Silver Medal.

For a maund of seed from such cultivation—Rs. 100.

For half a maund ditto ditto—Rs. 50.

For 5 beegahs of the best Lucerne, 100 Rs. and the Silver Medal.

For 2 beegahs of the best clover, 100 Rs. and the Silver Medal.

PROPOSAL

For the approval of the General Meeting.

With a view to stimulate natives to improve the breeding and feeding of cattle in Bengal, a show will be held on the 1st January, 1838, when small money premiums will be awarded for cattle of the best size and condition.

C. K. ROBISON.
CHARLES HUFFNAGLE.
N. ALEXANDER.
H. WALTERS.
N. WALLICH.
W. STORM.
JOHN BELL.

DEAR SIR,

I beg to acknowledge your's of the 19th instant, apprizing me of my nomination at the late General Meeting of the Agricultural and Horticultural Society, to be a member of the standing Committee for questions on the improvement of cattle.

Oblige me by communicating in reply to the Society in the proper manner, that observing a resolution of the same meeting excluding the cattle of Australia from competition for the prizes offered by the Society on imported cattle, I feel that it would be quite inconsistent in me as an avowed friend and active Agriculturist of Australia, to take any part whatever in a Committee restricted by such an exclusion. Allow me also to add, that as a member of this Society, I cannot comprehend how the exclusion in question can be otherwise than injurious to the object of the prizes held out. The quality of the cattle is what we should look to, not the place from which they may come, and I believe it will be found

that no part of the world produces finer than those of the colonies proscribed by the resolution in question.

I am sure the Society will give me credit for the best wishes for its prosperity, and not suppose that I decline the nomination from any other motive than the desire of consistency. Believe me, with the greatest good will,

Your's obediently and truly,
C. R. PRINSEP.

I regret I was not present on Wednesday at the Agricultural and Horticultural Society's Meeting, as I see by this morning's papers that you exclude New South Wales cattle from sharing in the premiums, on account of their not propagating in this country; this I think should be corrected as soon as possible, as I had a New South Wales cow imported per the ship *Bussorah Merchant*, that had a calf while in my possession, and when she died she was then in calf a second time. When it is convenient for the other gentlemen on the Committee for the improvement of cattle to meet, I shall be happy to attend.

W. F. GIBBON.

14th July, 1837.

To N. Wallich, Esq. M. D.
H. Walters, Esq.
N. Alexander, Esq.
C. K. Robison, Esq.
C. Huffnagle, Esq. M. D.
W. Storm, Esq.
W. P. Grant, Esq.
W. F. Gibbon, Esq.

*Members of the Committee for improving the breed of Horned Cattle
and Sheep in India.*

DEAR SIRS,

Before proceeding with the duties, which you have consented to un-

dertake, I beg leave to submit for your consideration two letters from gentlemen, whose experience and the deep interest they both take in the prosperity of this branch of Rural Economy, entitle their opinions to great weight.

The first is from Mr. C. R. Prinsep, who declines to act, for the reasons given in his note.

The second is from Mr. Gibbon, who appeals to his own experience for a contradiction of the impression which guided the Committee, in their proposal to exclude from competition the cattle of New Holland.

2nd. I believe the sole objection to admit the cattle of N. S. Wales and Vandiemans's Land, was grounded on the authority of a member of the Committee, that they would not propagate their species in India; and having adopted that authority, (in the absence of practical experience of others present) their report was confirmed by a General Meeting.

3rd. But it appears to me, that if upon re-consideration, the propriety of cancelling this exception be admitted, the Committee might still secure the valuable co-operation of Mr. Prinsep, and, perhaps, soothe that feeling of disappointment, which has been expressed by many, at the tenor of a resolution, which, if carried into effect, may injure the interests of the institution, and with a view, if possible, to get rid of this exception, in favour of a more popular motion, I have to solicit the favour of each member noting his opinion at the bottom of this communication, in order that the sense of the Committee may be collected before the next General Meeting of the Society.

I have the honour to be,

Your obedient servant,

JOHN BELL,

Agricultural and Horticultural Society's Office,

Secretary.

Calcutta, 25th July, 1837.

On the grounds explained in the above letter from Mr. Bell, I most anxiously hope that my colleagues will come to a resolution to expunge the exception which has been made against importing cattle from N. S. Wales and Vandiemans's Land in competition. The arguments con-

tained in the accompanying communications from Messrs. Prinsep and Gibbon, I humbly submit, are entitled to every consideration; and I do sincerely hope, that if the Committee should adopt Mr. Bell's recommendation, which I beg very anxiously to second, Mr. Prinsep will readily consent to grant us the benefit of his valuable aid, by joining our number.

N. WALLICH.

25th July.

The Committee have no reason for the exception to the N. S. Wales cattle, but a belief that they do not propagate in Bengal. Perhaps, it would have been better to have made a little more enquiry before we came to the decision, but it is easy to mend our error; and I would suggest that our Secretary explains to Mr. Prinsep the impression on which we have acted, and our desire to alter the resolution, if we find that it was an erroneous one. Mr. Gibbon's note shews that the cow will breed, probably crossed with the native cattle.

N. ALEXANDER.

The exception appeared to me to depend upon a very strong physiological fact, and I am happy to learn that we were wrong in our conclusions. It is certainly our duty to correct the error, and I cordially unite in recommending the offending clause to be expunged.

CHARLES HUFFNAGLE.

As the clause of exception appears to have been introduced in error, I think it ought to be expunged, and Mr. Prinsep requested to become a member of the Committee.

W. F. GIBBON.

In committee I stated that English imported bulls and cows were sold at the Isle of France with certificates of their origin, to distinguish them from N. S. Wales cattle, which were stated to fall off rapidly, both as breeders and for the dairy: the exception was, in consequence, inserted. At the General Meeting I did not vote, and when I found the excepting clause in the report, carried by a majority, I expressed my disappointment at no member of the Society at so large a Meeting being able

to afford personal knowledge of the facts ; and although I was chiefly concerned in the insertion of the exclusion, I was then ready to hold up my hand for its being expunged. The President stated, that the excluding clause had been carried, and must, therefore, stand.

This being the case, I consider that the Committee have no voice in the matter, and that the best way will be for some member of the Committee to move simply at our next General Meeting, that the excluding clause be expunged. I have no objection to be the person to move the resolution.

Mr. Gibbon states a valuable fact to the Society. Mr. Prinsep's letter does not afford any information, beyond his own resolution not to join a Committee which has excluded the cattle of a place he takes much interest in.

C. K. ROBISON.

25th July, 1837.

I think the exclusive clause should be expunged. We have in Mr. Gibbon's note some grounds to go upon, and the recommendation of the Committee would, no doubt, be received by the General Meeting, as sufficient reason for placing N. S. Wales on the same footing as other parts of the world.

W. STORM.

It would be a *bull* to give a premium for the importation of useless bulls ; but as the objection taken to N. S. Wales bulls appears to be partially removed, the restrictive clause should be removed also. At the same time I must remark, that a cow is not a bull, and that, notwithstanding Mr. Gibbon's fact, we have as yet no experience recorded contrary to the experience which formed the foundation on which the restriction rested. Nevertheless, I concur in voting that the restriction be rescinded, if only to put the alleged fact to the test of fair experiment.

H. WALTERS.

25th July.

I agree with my colleagues in thinking the restriction should be done

away with : I take the opportunity of adding that I shall readily assist the Committee.

W. P. GRANT.

To C. R. PRINSEP, Esq.

DEAR SIR,

Oblige me by reading the minutes of the Committee on the subject of your objection to afford us the aid of your co-operation.

Will you further oblige me, by signifying your assent to act, if the exclusive clause be expunged, of which I have not the slightest doubt.

Dear Sir,

Your obedient servant,

JOHN BELL,

Secretary.

Calcutta, 27th July, 1837.

MY DEAR SIR,

I shall be most happy to give my assistance towards the object in view, should the clause in question be rescinded; and I wish it to be so, not because I am interested in Australian Agriculture, but because I think a most undeserved imputation has been cast upon the propagating qualities of that part of the world, which, as far as my information goes, are stronger than any where else.

Believe me, yours sincerely,

27th July, 1837.

C. R. PRINSEP.

To N. Wallich, Esq. M. D.
 N. Alexander,
 H. Walters,
 C. K. Robison,
 W. F. Gibbon,
 C. R. Prinsep,
 W. P. Grant,
 C. Huffnagle, Esquires.

Members of the Cattle Committee.

Gentlemen,

Will you be pleased to offer your opinions on the subject of Mr. Storm's motion, which ought to have been made at the last meeting, but

was omitted by me ; when the question will come before the next General meeting, with the advantage of having the sense of the Committee attached ; and as the Resolutions have been already passed, in respect to the importation of bulls and rams, it is very desirable that no unnecessary delay should take place in publishing this addendum, should it be adopted by the Society.

I am,
Gentlemen,
Your obedient servant,
JOHN BELL,
Secretary.

Agricultural and Horticultural Society's Office,
17th August, 1837.

“Proposed by Mr. Storm ; seconded by Mr. Robison ; that premiums be given for the importation of the best cow, and Merino or Saxony ewe ;” say one half of that for bulls and rams, with the Silver Medal.

C. K. ROBISON.

The rate of premium should be less ; say one half.

N. ALEXANDER.

I see no rate of premium in the Resolution. What is the rate proposed ?

C. R. PRINSEP.

The rate of premium should be one half of that to be given for the males.

W. F. GIBBON.

I approve of the addendum and rate of premium as above.

C. HUFFNAGLE.

I also.

N. WALLICH.

Ditto.

H. WALTERS.

Proceedings of the Agricultural Committee.

A meeting of the Agricultural Committee was held at Mr. Bell's residence, on Thursday evening, the 29th June, 1837.

Present.

N. Wallich, Esq. M. D.

W. Storm,

J. Bell, Esquires.

The Committee had previously visited the Society's Nursery, and have great pleasure in reporting the thriving condition of the Cotton and Sugar-cane Plantations, especially the vigorous appearance of the canes recently received from Dr. Montgomerie, of Singapore.

Proposed by Mr. Storm, and *Resolved*, that the Secretary be instructed to address Dr. Stevenson, at Lucknow, and to solicit a large supply of Otaheite Cane Plants, and that a similar application be made to Captain C. Brown, Major Sleeman's successor at Jubbulpore.

Proposed by Mr. Storm, and *Resolved*, that the Secretary be requested to write to Messrs. Adam, Scott and Co. soliciting their influence with Messrs. Binny and Co., of Madras, to obtain for the Society a supply of Tinnevelly Cotton Seed, when procurable fresh, and if through the same medium, a supply of Seychelles Cotton Seed could be procured.

W. STORM.

N. WALLICH.

J. BELL.

I think the Seychelles seed may be obtained from the Isle of France through any house having an establishment there.

W. STORM.

Or we can get any quantity through the Hon. Mons. Bedier from Bourbon.

N. WALLICH.

Proceedings of the Agricultural Committee.

At a meeting of the Agricultural Committee, held at Mr. Bell's office, on Monday, the 29th July, 1837.

Present.

N. Wallich, Esq. M. D.

W. Storm,

J. Bell, Esquires.

This meeting was convened for the purpose of considering the best means of carrying into effect Mr. Cracroft's motion, to have an exhibition of native vegetables, with a view to encourage improvement in their cultivation, and to bring them into more general use by Europeans.

Proposed, 1st. That no time having been given to expect improvement from any pecuniary inducement, it is not advisable to fix a scale of rewards.

Proposed, 2nd. That a sum, not exceeding 150 Rs. be distributed in donations of 2 Rs. to those who have the best and most approved greens and fruits.

Proposed, 3rd. That the exhibition take place at the Town Hall, on Tuesday morning, the 15th of August, at 6 o'clock.*

Proposed, 4th. That the following members be requested to pass judgment on the best vegetables, &c.

E. Stirling, Esq.

Dewan Ramcomul Sen.

W. Cracroft, Esq.

Baboo Radhakant Deb.

Proposed, 5th. That Dewan Ramcomul Sen and Baboo Radhakant Deb, be solicited to make up a catalogue of all the native kitchen vegetables, with their properties and uses.

N. WALLICH.

W. STORM.

JOHN BELL.

* *Note*.—This early hour has been fixed with reference to the inconvenience to men in business of attending at 10 o'clock, and to give the mallies an opportunity of selling their vegetables in the different native Bazaars after the exhibition.

At a meeting of the Agricultural Committee, assembled at the Honourable Company's Botanical Garden, on Friday evening, the 4th August, 1837.

Present.

N. Wallich, Esq. M. D.

Wm. Storm,

John Bell, Esquires.

The Committee proceeded to visit the Society's Nursery, which was found in a very thriving condition.

The Sugar-canes and Cotton Plants looking vigorous.

A considerable addition has been made to the extent of ground first allotted by Dr. Wallich for the Society's operations ; and a large plot is now ready dug for the reception of Cane which is now anxiously looked for from Bourbon, through the polite interference of His Excellency Mons. Bedier ; and from Singapore through Dr. Montgomerie.

The Canes in the Nursery having been planted according to the native method, the Committee now propose to adopt that practised in the Mauritius and West Indies ; which will exhibit the extraordinary disparity between Canes planted within 3 inches of the surface, and Canes planted 18 inches deep.

A supply of oil-cake is daily expected from Fort Gloster, which will much improve the new ground that has been prepared. The addition of a moderate quantity of lime at the time when the nursery was first taken into cultivation for the Society, has undoubtedly much improved the old ground.

N. WALLICH.

W. STORM.

JOHN BELL.

Agricultural and Horticultural Society of India.

A General Meeting of this Society was held at the Town Hall, this morning, July 12th, at half past 9 o'clock.

Present.

The Hon. Sir E. Ryan, President, in the Chair.

The Hon. Sir B. Malkin; The Hon. Col. Rehling; Dr. Wallich; E. Sterling, Esq.; W. Cracroft, Esq.; W. Storm, Esq.; Colonel Macleod; Colonel Caulfield; C. K. Robison, Esq.; Joseph Willis, Esq.; M. M. Manuk, Esq.; F. P. Strong, Esq.; Captain White; Dr. A. R. Jackson; Dr. Voigt; A. Grant, Esq.; H. M. Low, Esq.; J. R. Bagshaw, Esq.; J. W. Masters, Esq.; Newaub Tohower Jung; Captain Carter; Professor O' Shaughnessy; A. Beattie, Esq.; G. A. Prinsep, Esq.; M. A. Bignell, Esq.; A. C. Dunlop, Esq.; C. Huffnagle, Esq.; C. Trebeck, Esq.; D. Hare, Esq.; D. W. H. Speed, Esq.; G. T. F. Speed, Esq.; T. A. Pitkin, Esq.; T. H. Gardiner, Esq.; T. Leach, Esq.; D. B. Syers, Esq.; John Bell, and several more Members, whose names could not be ascertained.

Visitors.

Mr. Wm. McCulloch introduced by Dr. Wallich, Messrs. George Rae, G Pratt, and J. Jenkins.

The proceedings of last meeting were read and confirmed.

The following Gentlemen proposed at last meeting, were elected Members of the Society:—

Lieut. J. Gilmore, Eng.; Allan Gilmore, Esq.; J. P. Mackilligin, Esq.; John Maclean, Esq.; N. Mackenzie, Esq.; Robert Watson, Esq.; R. H. P. Clarke. Esq. C. S.; J. Donald Esq.; W. F. Fergusson, Esq.; A. Laruleta, Esq.; G. De Gorastiza, Esq.; R. B. Garrett, Esq. C. S.; T. S. Kelsall, Esq.; John Stewart, Esq.

The following Gentlemen were proposed, viz.

Lieut. Wm. Munro, Secretary of the Mysore Agricultural and Hor-

ticultural Society, proposed by the Secretary, seconded by Wm. Storm, Esq.

Wm. Haworth, Esq., proposed by D. B. Syers, Esq., seconded by W. Storm, Esq.

R. Thomas, Esq., proposed by W. Strong, Esq., seconded by W. T. Fraser, Esq.

Dr. Duncan Stewart, proposed by Dr. A. R. Jackson, seconded by Dr. Wallich.

Jas. Colquhoun, Esq., proposed by Joseph Willis, Esq., seconded by Dr. Wallich.

Baboo Hurrymohun Sen, proposed by Sir E. Ryan, seconded by the Secretary.

Captain H. Kirke, (Deyrah,) proposed by Dr. Wallich, seconded by the Secretary.

Wm. Griffith, Esq., Assistant Surgeon, proposed by W. Earle, Esq., seconded by the Secretary.

Wm. Kerr Ewart, Esq., proposed by C. K. Robison, Esq., seconded by the Secretary.

J. B. Higginson, Esq., proposed by A. Beattie, Esq., seconded by the Secretary.

John Jenkins, Esq., proposed by W. Storm, Esq., seconded by the Secretary.

G. F. McClintock, Esq., C. S., proposed by H. Walters, Esq., seconded by the Secretary.

Read a letter just received from Mr. Marshman, forwarding 20 copies of the 4th vol. of the Society's Transactions, together with a memo. of the cost of printing and binding 500 copies, amounting to Rs. 1088-8-0. The Secretary was directed to pay the amount.

Memo.—This completes the publication of 3 vols. within 2 years.

The Report of the Committee appointed to consider the question of improving the Cattle of India, which was sent back at the last general meeting, for amendment, was read. It embraced the following Propositions, viz.

For Cattle imported between the 1st January and 31st December, 1838, the show to be held on the 1st Feb. 1839.

1st.—For the best imported bull (excepting the produce of New Hol-

land,)* not less than 2 years old, a premium of 500 Rs. and the Gold Medal.

For the second best, ditto ditto, a premium of 400 Rs. and the Silver Medal.

For the third best, ditto ditto, a premium of 300 Rs.

2nd.—For the best woolled ram, not less than 2 years old, a premium of 200 Rs. and the Gold Medal.

For the second best, ditto ditto, a premium of 150 Rs. and the Silver Medal.

For the third best, ditto ditto, a premium of 100 Rs.

3rd.—For the best produce of imported cattle half the above mentioned premiums, and the Gold and Silver Medals will be given on the 1st February, 1840.

4th.—To encourage the growth of good fodder.

For any person who shall shew a cultivation of 20 well planted beegahs of the best *Guinea Grass*, on or before the 1st January, 1838, either in Calcutta or the Mofussil, a premium of 200 Rs. and the Gold Medal.

For 10 beegahs of ditto ditto, 100 Rs. and the Silver Medal.

• For a maund of seed from such cultivation a premium of 100 Rs.

• For half a maund of ditto ditto, 50 Rs.

For 5 beegahs of the best Lucerne, 100 Rs. and the Silver Medal.

For 2 beegahs of the best Clover, 100 Rs. and the Silver Medal.

Moved by the Honourable Col. Rehling, seconded by Capt. Leach, that the Committee's Propositions be adopted. Dr. Jackson proposed, as an amendment, that the clause excluding the competition of N. S. Wales Cattle be struck out, unless any Member was prepared to state upon his own experience, that the supposed objection was valid. The amendment was put to the vote, and lost by a majority in favour of the original Resolution.

The proposal of Dr. Wallich, brought forward at last meeting, to have

* This exception was inserted by the Committee with reference to the advice of some of the Members, who understood that cattle from New South Wales did not propagate in India.

standing Committees in future, was again submitted with the following lists of names, suggested with reference to their knowledge of the subjects.

STANDING COMMITTEES.

<i>Sugar.</i>	<i>Cotton.</i>	<i>Silk, Hemp and Flax.</i>	<i>Coffee and Tobacco.</i>
N. Alexander.	Jos. Willis.	W. Speir.	Dr. Strong.
A. Colvin.	A. Colvin.	Ramcomul	Dr. Wallich.
Dwarkan. Tagore.	Dr. Huffnagle.	Sen.	H. Walters.
D. Hare.	G. A. Prinsep.	Pro. O'Shaughnessy.	G. A. Prinsep.
G. U. Adam.	W. Speir.		sep.
A. Muller.	W. Storm.	Jos. Willis.	Capt. Leach.
J. Allan.	D. B. Syers.	R. Watson.	D. W. H.
W. Storm.	W. Earle.	C. K. Robison.	Speed.
J. Dougall.	G. U. Adam.	H. M. Low.	H. M. Low.
J. W. Masters.		G. T. F. Speed.	D. Hare.
		D. W. H. Speed.	
		W. Storm.	

<i>Implements of Husbandry and Machinery.</i>	<i>Caoutchouc and Oil Seeds</i>	<i>Improvement of Cattle.</i>
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E. Sterling.	Dr. Wallich.	Dr. Wallich.	
Col. MacLeod.	Professor	H. Walters.	Agricultu-
Jas. Prinsep.	O'Shaughnessy.	N. Alexander.	ral Commit-
W. Cracroft.		C. K. Robison.	tee and Com-
Ramcomul	Ramcomul		mittee of Pa-
sen.	sen.	Dr. Huffnagle.	pers to re-
C. K. Robison.	W. Speir.	W. Storm.	main as now
H. Walters.	Radhakant	W. P. Grant.	constituted.
Radhakant	Deb.	C. R. Prinsep.	
Deb.	J. P. Marcus.	W. F. Gibbon.	
Dr. Huffnagle.	Dr. Corbyn.	Dr. Jackson.	
D. Hare.			

Moved by Dr. Strong, seconded by Col. Rehling, and unanimously resolved, That the above Committees be confirmed, and that the Secretary be directed to circulate the lists, soliciting the Members appointed, to give the Society the benefit of their assistance when called for.

The President drew attention to a memorandum from the Secretary, proposing to increase his Assistant's salary from 100 to 150 rupees per month, on the ground of greatly enhanced labour, and with reference to his intelligence and constant attendance.

The Secretary begged to explain that Mr. Blechynden had never hinted at an increase, but Mr. Bell considered him deserving of more.

Resolved.—Nem. Con. That the Assistant's salary be increased to 150 rupees.

Read the proceedings of the Assam Silk Committee, which simply embodied two resolutions, to write to Captain Jenkins for a larger sample, with cocoons in their different stages, and to send the silk received to Professor O'Shaugnessy for report.

Read a note from Messrs. Cantor and Co. informing the Secretary that they held 500 rupees, at the disposal of the Society, from Captain Jenkins, for a premium to encourage the culture, &c. of Area silk, and winding it off the cocoon.

The Secretary was directed to receive the amount.

Read the proceedings of the Agricultural Committee, held on the 29th June, reporting favourably of the canes and cotton in the Society's Nursery, and proposing that the Secretary should make application to Dr. Stevenson, of Lucknow, and Captain Brown, at Jubbulpore, for supplies of Otaheite sugar-cane; further that he should apply to Messrs. Adam, Scott and Co. for their assistance to secure some Tinnevely and Seychelles cotton seeds.

The Secretary brought forward a motion, seconded by H. Walters, Esq., with a view to encourage the importation of Otaheite cane, for distribution throughout India, viz.

"1. That a premium of 500 Rs. be awarded to any commander, or other person, who may import from the Mauritius 500 full grown full length Otaheite canes in a vegetating condition, not later than the 31st January, 1838.

2. That 250 rupees be given for 250 ditto ditto canes.

3. That the gold medal and a premium of 1,000 rupees be awarded to any cultivator who can exhibit 100 Bengal beegahs of Otaheite sugarcane, on or before the 1st January, 1839; each plant to be four feet apart, and to be planted on the West India plan, not in ridges but square holes, with some further conditions, regarding the purchase by the Society of the produce.

Proposed by Dr. Strong, seconded by Mr. Willis, that the Secretary's suggestion be handed over to the Sugar Committee for consideration, and report at next meeting.

In connexion with this question Mr. Willis submitted an extract of a letter just received from a correspondent at Mauritius, stating the difficulty he experienced in that island to procure canes for exportation to India, owing to a little jealousy on the part of the planters, mentioning at the same time, that the Otaheite cane was nearly exhausted, and hinting that to Batavia we ought to look for supplies.

The Secretary informed the meeting, that in consequence of a heavy incoming charge of postage demanded upon Magistrate's returns of grain forwarded to the Society, under the instructions of Government, he had, by direction of the Committee, applied to the Post Master General, for a return of postage, on the ground that the despatches were superscribed "on Service," and further that he had since his address to the Post Master General, returned several expensive parcels of Persian returns, pending the reference.

The Post Master General in reply, states his inability to meet the Society's wishes on the plea that this Society is not a public body, and that the several Collectors and Magistrates must have superscribed their despatches inadvertently *on Service*.

Read a letter from Dr. D. Stewart, Secretary to the Statistical Committee, offering to arrange, in a tabular form, the returns of grain received from the different Collectors by the Agricultural Society.

The President proposed, and it was *resolved*, that the Secretary do place himself in communication with Dr. Stewart on the subject of these returns, and if necessary, submit an application to Government on the question of postage.

Sir Edward Ryan presented to the Society, a paper containing "*Observations on the Culture of Hops*," recently received by Sir Henry Fane,

from a practical farmer in England, together with an extract of a letter which accompanied the "observations."

Sir Henry Fane's attention to the subject was arrested, when his Excellency arrived in the Upper Provinces, and he immediately wrote to a gentleman in England for a supply of seed. This not being obtainable, (not being seed time), a box containing plants was despatched to Sir Henry on the *General Kyd*, and as that vessel has arrived some time, we may soon hope to hear the result of the experiment of sending live plants.

It is satisfactory to note that Sir H. Fane's opinion of the climate of Upper India being well adapted to the growth and maturity of the Hop, is seconded by Dr. Campbell, of Nepaul, who has very recently applied to the Secretary to endeavour to procure him some seed, and there are few more capable, from actual observation, to give an opinion on this matter than Dr. Campbell.

Proposed by Dr. Wallich, seconded by Mr. Bell, that the thanks of the meeting be offered to Sir Henry Fane for this fresh mark of his zealous co-operation to advance the views of the Society, and that the paper presented by the President, be Published in the 5th volume of the Society's Transactions.

Read a letter from the President of the Royal Horticultural Society of Paris, dated 20th January, 1837, to the address of the President of this Society, presenting a copy of Transactions for the year 1836, expressive of the lively interest felt by that institution in the success of our endeavours to improve the resources of India, and as the objects of both are the same, the Society of Paris hopes to enjoy uninterrupted friendship with that of Calcutta in prosecuting enquiry into the avenues of Horticulture and Floriculture. Sir Edward Ryan engaged to reply to the President's very courteous and flattering communication.

Read a letter from W. Blundell, Esq., dated Moulmain, 13th June, to the address of Sir E. Ryan, speaks in rather desponding terms of his cotton plantations, owing to an unusual fall of rain. Mr. Blundell does not opine favourably of the Pernambuco cotton; he admits that in point of quality it is all that can be desired, but the produce is small, and Mr. B. thinks it will not answer as a source of commercial profit.

Mr. Blundell speaks of the Caoutchouc as likely to become a valuable

export from the surrounding jungles, in reference to sundry experiments made by Dr. Helfer, on the juices of a variety of trees and creepers. Mr. B. alludes also to *Potash* as likely to form an additional item of some importance.

From Dr. Helfer to the Secretary, dated Moulmain, 12th June, sending a box containing a variety of specimens of Caoutchouc, and one of Gamboge, procured from the jungles, accompanied by remarks on each

Resolved, that Dr. Helfer's letter and specimens be submitted to the Committee appointed to report upon Caoutchouc, &c.

From W. H. Macnaghten, Esq., Chief Secretary to the Government of India, dated 19th June, annexing copy of a letter from the Chief Secretary to the Government of Madras, dated 30th ult. together with copies of circular letters from Dr. R. Wight, of Madras, respecting the improvement of the cultivation, &c. of the different staple products of India.

From Dr. Wallich, dated 7th July, presenting to the Society a pamphlet on the cultivation of Cotton, by Dr. Lush, of Bombay.

Read the following extract of a letter from Earl Fitzwilliam to Dr. Wallich, dated 13th February, 1837.

"When you and your friends did me the unexpected honour of entrusting to my unworthy hands, their petition for equality of trade, I certainly did not expect to see that object accomplished with the rapidity and success that has astonished us. But we are now governed upon principles which enable the government to grapple with difficulties which would never have been overcome by a less popular system. It was done without any reclamation on the part of the West Indians, who, instead of being ruined, have been benefited to an extraordinary degree by the emancipation of the slaves, and are, therefore, able to bear a competition at which they would previously have started."

Capt. Jenkins desires to be informed why the yellow stick lac of Beerbhoom sells for a higher price than the purple stick lac of Siam and Pegu, and the dark red of Assam and Sylhet; also, whether the insect is cultivated or gathered in the wild state in Beerbhoom. Capt. Jenkins wishes to know why the depth of colour should lessen the price, and if it in any way affects the quality of the lac when converted into shell lac.

Perhaps some members can answer these questions.

From Mr. A. Millet, of Entally, to the Secretary, dated 8th July, enclosing for the consideration of the Society, a prospectus of a joint-association for the cultivation of musk-melons.

The Secretary was directed to intimate that such schemes did not come within compass of the Society's intentions.

From J. W. Grant, Esq., Export Warehouse Keeper, to the Secretary, dated 17th June, calling for information respecting the disposal of cotton and tobacco seed imported from England, in 1830, by order of the Court of Directors.

The Secretary had rendered an account of disposal.

From Lieut. W. Munro, Secretary and Manager of the Bangalore Society, now designated the "*Mysore Branch Agricultural and Horticultural Society*," to the Secretary, dated 24th May, enclosing a most interesting summary of their transactions, from the beginning of their very short, but most successful career, and returning thanks for the amount of aid contributed by this Society in the way of seeds, &c.

From H. Walters, Esq., to the Secretary, dated 7th July, enclosing an extract from the *Englishman* relating to the latest commercial intelligence from England. The writer of the article enters at great length upon the advantages that would accrue to India, by a well directed mode of attracting the application of capital and skill to some of our neglected staples, as sugar, coffee, tobacco, &c.

From A. Ronald, Esq., of Duncaree, dated 8th June, furnishing replies with reference to the eastern part of the district of Goruckpore, to the queries conveyed in the Society's circular of the 31st March last.

From Major J. D. Syers, dated Cuttack, 22d June, advising the despatch through Messrs. Livingston, Syers and Co. for the opinion of the Society, samples of Cabool, Persian and Virginia tobacco and *Peruvian* cotton, being the produce of the Branch Society's garden.

These samples were ordered to be made over to the respective Committees, when received by the Secretary.

From C. K. Robison, Esq., dated 20th June, enclosing a note from Mr. James Prinsep, forwarding four silver medals for the inspection of

the Society, value including workmanship 18 Rs. each, which had been paid by the Secretary to Mr. Robison.

From Dr. Gordon, of Ambalah, dated 21st May, to Mr. D. W. H. Speed. Mr. Speed submitted this letter, to show the utility of the Society in exciting a spirit of enquiry, and as leading to the opening of new resources. Dr. Gordon was led by the proceedings published in the papers, to give his attention to silk, and from the instructions contained in Mr. Speed's paper on the culture of silk, has now, although before a perfect stranger to the art, completely succeeded in introducing silk into a district, where it had never been seen.

From Professor O'Shaughnessy to Dr. Wallich, dated 10th July, reporting favourably of some specimens of Caoutchouc, sent round by Capt. Jenkins.

From W. C. Crane, Esq., dated 6th July, presenting a fair specimen of the Sea Island cotton grown at Singapore.

From the same, dated 11th July, noticing in the scale of premiums offered for staples, what in his opinion is an inconsistency.

Proposed by Mr. Bell, seconded by Mr. Storm, and *Resolved*, that new Members shall only be entitled to such part of the Transactions as may be publishing or published after their admission, and that all preceding parts, or volumes, if required, be paid for at the retail price.

Proposed by Mr. Sterling, seconded by Mr. Cracroft, and *Resolved*, that the Secretary be requested to open a correspondence with Professor Royle on all questions regarding Caoutchouc, which may come from time to time before the Society.

Proposed by Mr. N. Alexander, seconded by Mr. Storm, and *Resolved*, that a show of fruit and vegetables be held on or about the 1st June, 1838, and that rewards be given in the same manner as at the show in the cold weather.

Proposed by Mr. Cracroft, seconded by Mr. G. A. Prinsep, that an exhibition take place early in August next, with a view to encourage the growth of indigenous vegetables by giving small monied premiums.

N. B. This proposition is necessarily referred to the Agricultural Committee, as nothing is stated regarding the scale of premiums.

From Rajah Kalee Krishna, dated 17th June, presenting some seed of the arhur dholl, together with a short description of the best mode and time of sowing it.

From Col. Stacy, dated Allyghur, 3d June, advising the despatch of some cotton, pumpkin and early cauliflower seed, also some cotton of the cone-shaped cotton plant.

From Major Moore, dated Hyderabad Residency, 15th June, promising to forward some grafts of the tree from which these apples grow, so as to reach Calcutta by October next, and desiring some to be given to Mr. Storm.

From Messrs. Adam, Scott and Co., in reply to the Secretary's request, promising to procure some Tinnevely cotton seed, &c.

From Mr. J. W. Masters, dated 11th July, forwarding 10 seeds of Upland Georgia cotton seed, and 4 of New Orleans ditto, do. the produce of the Society's nursery.

A very valuable French Work on the cultivation of the Orange, with plates, was presented to the Society by F. T. Fergusson, Esq.

The thanks of the meeting were ordered to be offered for all the foregoing contributions.

Agricultural and Horticultural Society of India.

A General Meeting of this Society was held at the Town Hall, this morning, AUGUST 9th, at half past 9 o'clock.

Present.

The Honourable Sir E. Ryan, President, in the Chair.

Dr. Wallich, W. Cracroft, W. Storm, R. Watson, C. K. Robison, A. Colvin, W. Speir, E. Sterling, E. Harding, G. A. Prinsep, M. Manuk, D. McPherson, and J. S. Stopford, Esqrs.; Nawaub Tohowerjung, Dr. A. R. Jackson, Dr. Huffnagle, N. Alexander, D. Hare, M. A. Bignell, D. W. H. Speed, G. T. F. Speed, W. F. Gibbon, T. Hyde Gardiner, A. Grant, H. M. Low and John Bell, Esqrs.

Visitor.

Mr. D. McDougall.

The proceedings of last Meeting were read and confirmed.

The following Gentlemen proposed at the last Meeting, were elected Members of the Society.

Lieut. Wm. Munro ; Wm. Haworth, Esq. ; Dr. Duncan Stewart ; Jas. Colquhoun, Esq. ; Baboo Hurrymohun Sein ; Capt. H. Kirke ; W. Kerr Ewart, Esq. ; J. B. Higginson, Esq. ; John Jenkins, Esq. ; G. F. McClin- tock, Esq. ; Wm. Griffith, Esq. ; R. Thomas, Esq.

The following Gentlemen were proposed ; viz.

F. P. Buller, Esq. C. S., (of Shalhjanpore,) proposed by the Secre- tary, seconded by W. Storm, Esq.

P. Barron, Esq., (of Shalhjanpore,) proposed by the Secretary, se- conded by W. Storm, Esq.

F. T. Fergusson, Esq., proposed by the Secretary, seconded by W. Storm, Esq.

L. Rousseau, Esq., proposed by the Secretary, seconded by W. Storm, Esq.

E. Preston, Esq., proposed by G. T. F. Speed, Esq., seconded by W. Storm, Esq.

Thomas Maddock, Esq., C. S., proposed by Dr. Wallich, seconded by Dr. Hufnagle.

E. Bentall, Esq., C. S., proposed by J. R. Bagshaw, Esq., seconded by W. Storm, Esq.

James Church, Esq., proposed by E. Harding, Esq., seconded by C. K. Robison, Esq.

Owen John Elias, Esq., proposed by H. Walters, Esq., seconded by the Secretary.

The President opened the business of the day, by submitting a se- ries of propositions, with a view to preserve order and regularity in the proceedings which are liable to much interruption from motions being introduced at every stage ; viz.

1st.—That all motions shall be brought forward at the monthly Meet- ings *before the reading of fresh papers and letters commences*, clearly written out, and signed by the mover, or party deputed to bring forward such motion, the Secretary to record all propositions in a book to be kept for this purpose.

2nd.—Motions of which notice has been given at a previous meeting

shall have precedence of all others, and in order to guard against confusion, the Secretary will number the propositions in his Register.

3d.—Motions brought forward after the time alluded to in the 1st Proposition, shall not be attended to; but they may be handed over to the Secretary who will note them, as "*new motions without notice*," to be brought up at the next General Meeting, in common with others, which may be then submitted.

Proposed by Alex. Colvin, Esq., seconded by G. A. Prinsep, Esq., and and *Resolved, nem con.* that the above series of Propositions be added to the Standing Rules of the Society.

The Secretary informed the Meeting that he had formally notified to the several members their nominations to the Standing Committees appointed at the last General Meeting—who had all accepted office, save Mr. C. R. Prinsep, who objected to sit on a Committee, while an exception existed to the prejudice of the Cattle of New Holland.

In consequence of Mr. Prinsep's objection, the Secretary had submitted data in opposition to the opinion which gave rise to the offensive clause,—and the President now submitted that with reference to the Minutes, he thought the exception ought to be removed, and it was—

Resolved,—That the clause in question be rescinded. This resolution being passed, adds the name of Mr. C. R. Prinsep to the Cattle Committee.

Dr. Jackson was quite willing to give his best aid to the Coffee and Tobacco Committee, but felt that he would be more at home on the subject of *Cattle*, and requested that his name might be transferred from one to the other, which will be done.

The President had much pleasure in submitting copy of a despatch from the Honourable the Court of Directors to Government, bearing date the 22d March, 1837, in reference to the Society's Report upon experiments made at Akra, forwarded in a letter from the Secretary to Mr. Secretary Bushby, under date 26th September, 1835, for transmission to the Honourable Court accompanied by samples of Cotton Twist and Cloth.

The Court of Directors express much satisfaction at the exertions of the Society, and although their views were cramped by reason of the limited space which marked their operations, the Court are pleased to

augur favourably of them as indicating successful results from a more extended application to a variety of soil and climate. The letter goes minutely into an analysis of the samples of produce sent home by the Society, shewing the prices assumed by Messrs. Willis and Earle generally to range a shade below those adopted in England by Brokers, upon whose reports the Court's remarks are framed,—and as some discussion arose as to dates of valuation, it was agreed to hand over the letter to the Standing Cotton Committee, to compare dates, for the satisfaction of the Society, as the subject was one of the first importance.

The motion of Mr. Bell made at last Meeting, having for its object the speedy introduction of the Otaheite Sugar Cane on an extensive scale in Bengal, had been in pursuance of a Resolution then passed, submitted to the Standing Sugar Committee, and was now brought forward under a favourable report, re-modelled in some respects to meet exigencies, but the same generally in substance.

Proposed by Dr. Wallich, seconded by the President, and unanimously *Resolved*—

That the Report of the Committee (with a few verbal amendments suggested at the Meeting,) be adopted.

Note.—The Report and Resolutions being too long for insertion here, will appear in a separate form, for the information of the public.

Read a letter from F. Macnaghten, Esq., Government Agent, to the Secretary, dated 7th August, rendering two Accounts Current of the Funds of the Society in the Government Agency Office, brought down to the 30th April, 1837, shewing the amount of fixed Assets at that time to be Sa. Rs. 15,500, since which the Secretary had invested 1,500 Rs. more, the sum now in Co.'s Paper being 17,900 Co.'s Rs.

Mr. Robison submitted two Gold Medals of different thickness, the one to cost about 230 Rs. the other about 150 Rs., but some members thought that a Medal more worthy of the Society, ought to be had, by commissioning a new die from England, and it was agreed to refer the question to the Medal Committee, recommending for the present, that one of those now presented be adopted to meet the engagements of the Society with successful competitors.

Mr. Robison presented samples of Silk, the produce of Mr. Mutti's filature in the Dekhan. The Silk is of very superior quality, produced

from the worm fed on the full grown Mulberry tree, and was sold by Mr. Mutti to Natives at 16 Rs. per seer, being 2 Rs. more than the best China Silk was now selling for. This price Mr. Mutti calculates to leave him 11 Rs. profit per seer, since he can, under *tree* cultivation, produce this Silk for 5 Rs. per seer. The proud position in which Mr. Mutti now finds himself,—after the most patient uncompromising zeal, cannot but be most gratifying to himself, and most encouraging to others.

Read a letter from Dr. J. McClelland, dated 20th July, presenting to the Society 3 copies of a Catalogue of "Objects in Natural History" collected by him in Assam.

Mr. Cracroft presented to the Society, 2 folio volumes, containing a splendid collection of dried specimens of Plants and Shrubs, gathered by him in Van Dieman's Land, in the best possible preservation.

Read a letter from Dr. A. Campbell, dated Nepal Residency, 25th July, forwarding 34 specimens of the Agricultural productions of the valley of Nepal, together with 8 others of the field productions of the plains of Sarun and Tirhoot. Suggests the transmission of some of these specimens to the Agricultural Committee of the Royal Asiatic Society of Great Britain, for the purpose of ascertaining the relative value in commerce of some and for the introduction into England, on the more suitable countries of Europe, of others.

Resolved,—That the Secretary do adopt Dr. Campbell's suggestions, reserving some of each kind for comparison in Calcutta, and that a portion of each be handed over to Dr. Wallich for experiment in the Society's Nursery.

From Geo. Leyburn, Esq., dated Nunnore, Shahabad, 7th July, presenting a quantity of Cotton and Seed, the produce of *Egyptian Seed* supplied by this Society, in May, 1836, and sown at the commencement of the rains in July.

From F. Harris, Esq. dated 27th July, presenting some Cotton, the produce of *Egyptian Seed* received from the Society, in May, 1836, and planted in the Soonderbuns.

(Mem. These samples were directed to be made over to the Committee for report.)

N. B. Parties growing Cotton, are particularly requested to send some *entire pods*, and to state the number of pods on each bush, on an average.

From Major Syers, Secretary to the Cuttack Society, presenting some Cotton and Tobacco, adverted to in his letter of the 22d ultimo, and noticed in last month's proceedings.

(Referred to the Cotton Committee.)

From Capt. Jenkins, dated Assam, 21st July, to the address of the Secretary, promising to send down for the inspection of the Committee a maund of the Area Silk and samples of the Cloth and Thread manufactured from it, requesting further information on certain points in Mr. Gouger's letter, which he does not exactly understand.

(Referred to the Silk Committee.)

From Dr. Wallich to the Secretary, dated 18th July, 1837, giving cover to a letter to his address from A. Aiken, Esq. Secretary to the Society of Arts, London, dated 27th February last, on the subject of several specimens of Assam Silk, sent to the Society by Capt. Jenkins through Dr. Wallich, for examination.

(Referred to the Silk Committee.)

From Dr. Hufnagle, dated 20th July, presenting to the Society some seeds of the Grape and Apple from fruit brought out in Ice, accompanied by a healthy plant of each, which Dr. H. had raised and submitted as samples of what may be effected, if every member would apply himself to some experiment, however trifling—the Secretary had previously received several seedling vines from the same gentleman, from the same source which have been planted out, and are now doing well.

Resolved,—That Dr. Hufnagle, is entitled to the special thanks of the Society for his interesting experiment.

From F. Furnell, Esq., Secretary to the Branch Society of Beerbhoom, reporting favourably of the Upland Georgian and Sea Island Cotton, also the American Maize and Coffee Plants, which are doing well. Requests a supply of *Oats* for trial.

From W. Moore, Esq., Deputy Post Master, dated 4th August, desiring information as to the Society's views, in regard to the accumulation of returned packets by the Secretary, now in the General Post Office. These packets contain returns of prices of Grain in Persian, forwarded by the several District Magistrates, but although superscribed "*service*," have postage marked upon them. The Secretary was directed to write again to Dr. Stewart on the subject of an appeal to Govern-

ment, as his first letter remained unanswered up to this date ; until the question was decided, the letters might be allowed to remain at the General Post Office.

From W. Liddell, Esq. Secretary to the Madras Society, (without date) stating in reply to the Secretary's query regarding the missing share of the Plough purchased from Capt. Dalrymple, that it was forwarded in a complete state from Madras.

From E. Sterling, Esq. to the Secretary, dated July 24th, drawing attention to an approved Plough now in use at Bombay, and as one of these Ploughs has been long promised to this Society, Mr. Sterling's communication was referred to the Committee of Implements of Husbandry and Machinery.

From—Laidlay, Esq. Secretary to the Branch Society of Moorsheda-bad, stating that the different seeds furnished by this Society have (with the exception of the Canada Maize,) proved excellent.

Presents a green Mangoe, plucked from a tree bearing two crops annually, and offering to send down some slips from the tree.

From the Rev. Mr. Boaz, a specimen of "South American" Cotton, said to be grown in Mr. Penny's garden, Circular Road.

From Mr. G. Pratt, dated 9th August, offering (with reference to a query proposed by Captain Jenkins in last month's proceedings) some information on the subject of Stick and Shell Lac, and presenting to the Society 10 different specimens of the same.

(Referred to the Committee for Oil Seeds, &c.)

From Lieut. Brodie, dated Assam, 13th July, stating that he has not succeeded with the Tobacco and Cotton Seeds forwarded by the Society, requesting fresh supplies.

From Dr. Wallich, dated 8th August, enclosing a letter from Monsieur Bedier, Governor of Chandernagore, which contains an extract from one of the Bourbon authorities, stating that the order which had been given for the Sugar Cane by His Excellency Monsieur Bedier, has not been forgotten ; the same authority promises to forward the Canes for this Society, on his return from a distant part of the Island.

Resolved,—That the special thanks of the Society be offered to the Governor of Chandernagore, for the warm interest he takes in the progress of this Institution.

The same letter from Dr. Wallich, gives cover to one from Lieut. Kirke, adverting to some experiments he proposed making in the Doon, but Lieut. Kirke's communication is private, and not addressed to the Secretary for publication.

The proceedings of the Agricultural Committee were read and confirmed. The Committee reported favourably on the Sugar Cane, &c. in the Nursery, and settled the matter of exhibition which is to take place on Tuesday morning next, at 6 o'clock, proposing as judges, Messrs. Cra-croft and Sterling, Dewan Ramcomul Sen and Baboo Radhakant Deb. The Committee further proposed, that Dewan Ramcomul Sen and Baboo Radhakant Deb be solicited to make up a Catalogue of all the native kitchen vegetables, with their properties and uses.

The following propositions will be brought forward at the next meeting.

Proposed by Mr. Storm, seconded by Mr. Robison, that premiums be given for the importation of the best Cow, and Merino or Saxony Ewe.

Proposed by Dr. Jackson, seconded by Mr. Bell, that a premium be offered for a certain cultivation of Carrots for feeding cattle.

Proposed by H. Walters, Esq., seconded by Mr. Bell, that an abstract of all premiums offered by the Society be printed in Hindee and Bengalee for distribution among the natives.

The thanks of the Society were ordered to be offered for all the above communications and presentations.

SUGAR.

Premiums to be awarded by the Agricultural and Horticultural Society of India, to encourage the importation of Otaheite Sugar Cane, and its cultivation in Bengal.

Report of the Sugar Committee, on the motion brought forward by Mr. Bell at the July General Meeting of the Society, with a view to encourage the importation of Otaheite Sugar Cane for distribution throughout India.

In accordance with the Resolution passed on the 12th July, a meeting was convened at the Society's Office, Town Hall, on Wednesday morning, the 3d August, when Alexander Colvin, Esq., was unanimously elected Chairman of the Standing Sugar Committee.

Present.

A. Colvin, Esq. in the Chair ; W. Storm, D. Hare, G. U. Adam, A. Muller, J. W. Masters, and John Bell, Esqrs.

The Secretary informed the Committee that Mr. N. Alexander who was prevented from attending by being on the Grand Jury, had called upon him to explain his intention to have opposed Mr. Bell's suggestions, on the grounds of experiments made by Messrs. Henley and Blake, the results of which Mr. Alexander said were unfavourable to the encouragement of the Otaheite, in preference to the indigenous and China Cane, that were thought to yield more saccharine matter than the Otaheite kind, while they did not exhaust the soil in the same ratio.

The Committee, after giving their best consideration to the objections offered by Mr. Alexander, do not think them based on sufficiently accurate data to warrant their adoption, as many circumstances might have combined to lead the parties making such experiments to arrive at wrong conclusions, and have, therefore, agreed to the following

REPORT.

Your Committee cannot allow the opportunity, which presents itself at the commencement of their labours to pass without an expression of regret, that so little has yet been effected in the way of introducing a superior Cane throughout India, but they cannot withhold their humble tribute of praise, which is due to the persevering zeal of Major Sleeman, who, from a small supply of Otaheite Cane brought by him from the Mauritius in 1827, has now raised a nursery at Jubbulpore, which feeds the surrounding districts.

To the exertions of Col. Colvin, the Upper Provinces are likewise indebted for the introduction of this superior product, and the Society of Lucknow boasts of an extensive nursery of the same description of Cane.

The comparatively slow progress of its introduction into the Lower Provinces may fairly be imputed to circumstances over which the Society has no controul, since its attention to the importance of the measure may be traced in its report upon experiments carried on at Akra

Farm, and the distribution of Cane produced there is evidence of the anxiety felt to give it a fair trial.

The average weight of middling sized Otaheite Cane, grown at Akra, was 9lbs. each, while that of the common Dessee Cane was 1lb. each.

The experiments further showed that excellent ratoons were produced from the stoles of the first year's plant, and this is a very important point to be kept in view, when placed in juxta position with the stunted indigenous Cane, which requires a new rotation crop every year at an immense waste of labour and irrigation, and it is a singular coincidence, that the same prejudice existed, not very many years ago in the West Indies, against the introduction of the Otaheite Cane in the Slave Islands, under a similar impression as that entertained by Messrs. Henley and Blake, of its *watery* qualities, until from actual experiments made on a large scale by one or two public spirited individuals,—the spell was broken and now nothing save the "Otaheite" waves triumphant in every Island.*

That such will be the case a few years hence in India, your Committee entertain very sanguine hopes, and under this conviction, and with a view to bring about this consummation as early as possible, they would recommend the adoption of Mr. Bell's suggestions in the amended form now submitted.

Proposed, 1st. That one Rupee be offered for every full grown Otaheite Cane, or for every eight feet of cut Cane that may be imported by sea from the Mauritius or other place beyond the continent of India, within the next eight months from this date, and that it be optional with the Society to limit or extend their purchase to, or beyond 1,000 Canes, the money for such Canes to be paid under a certificate of the Agricultural Committee as to their vegetating powers, on examination, immediately after arrival at the Honourable Company's Botanical Garden.

Proposed, 2nd. That in addition to the premium of one Rupee for each Cane the *gold* medal be awarded to any individual who shall first import as above, two hundred full grown full length Otaheite Canes, or

* *Note.*—For examples of success in India, vide Transactions, vol. iii. pages 42 (56 para. 4) 57, (72 paras. 1, 2, 3.)

a quantity of cut packed Cane, equal to 1600 running feet, within the period notified in the 1st Proposition.

Proposed, 3d. That in addition to the premium of one Rupee for each Cane, the silver medal be awarded to any individual who shall import as above the second two hundred whole Canes or cut Canes (packed), equal to 1600 running feet, within the period above described.

Proposed, 4th. That a premium of two thousand Rupees and the gold medal be awarded to any cultivator who can exhibit, on or before the 1st January, 1839, fifty regularly planted Bengal Beegahs of Otaheite Sugar Cane, in the best condition and most advanced state of cultivation, and of at least six months standing in any part of Bengal, each plant to be four feet apart, and laid in holes 18 inches deep, after the West India plan of cultivation, on condition that the first year's produce be offered to the Society for purchase, and on condition that the Cultivator allow the stoles to remain, the ratoons produced from such stoles being offered for sale to the Society, at a price not exceeding two pice per full grown ratoon, or in the event of the above not being claimed, the sum of one thousand Rupees with the silver medal be awarded for any quantity of cultivation not less than 25 Beegahs, on the same terms or conditions as above, preference being given to the largest extent of cultivation.

Proposed, 5th. That it shall be incumbent on competitors to transmit at their own expense, not less than twenty of their best Canes to the Secretary, accompanied by a certificate under the signature of the nearest authority, on honour, that the cultivation is so many beegahs, and the decision of the Sugar Committee will be received by the Society, in evidence of the successful candidate.

Your Committee have been induced to confine competition to Bengal, as it is considered that the Otaheite Cane has, through the several channels already noticed, been firmly established in the Upper Provinces, including Goruckpore.

In conclusion, adverting to a letter read at the last General Meeting of this Society, to the address of Mr. Willis, your Committee while they regret that any feeling like jealousy should exist on the part of the Mauritius Planters, to which is attributed the difficulty of obtaining supplies from thence, do not regard this feeling with the slightest apprehension as to the ultimate successful introduction of the Otaheite Cane, and

they are disposed rather to attribute the difficulty to some other cause, for it would be folly in the Mauritius Planters to exhibit any dread of competition from India, by simply denying us a few plant Canes, when aware, or at least they may now learn from this Report, that we are independent of foreign supplies, but hold out those premiums only to induce an *early* consummation of what must in a few years, take place without further assistance from without.

Lastly. Your Committee desire to recommend, that these Propositions based on the suggestions of the Secretary, be adopted without any more delay, as notice cannot be longer protracted with any fair prospect of obtaining plants in season and within the period prescribed, and that the Secretary be requested to annex to the series of Resolutions, a memorandum pointing out the mode of packing, &c. which has been on actual trial found best.

A. Colvin,

A. Muller,

G. U. Adam,

W. Storm,

J. W. Masters,

D. Hare,

John Bell.

Agricultural and Horticultural Society of India.

A General Meeting of this Society was held at the Town Hall, on Wednesday morning, the 13th SEPTEMBER, 1837, at half past 9 o'clock.

Present.

The Honourable Sir E. Ryan, President, in the Chair.

His Excellency Monsr. Bedier ; The Honourable Colonel Rehling ; Dr. Wallich ; Col. D. McLeod ; D. F. McLeod, Esq.; W. Storm, Esq.; A. Colvin, Esq.; R. Watson, Esq.; W. Cracroft, Esq.; E. Sterling, Esq.; Dr. Jackson ; Dr. Huffnagle ; Dr. Goodeve ; Col. Caulfield ; Capt. Carter ; N. Alexander, Esq.; D. Hare, Esq.; M. Staunton, Esq.; Dr. W. B. O'Shaughnessy ; Dr. R. O'Shaughnessy ; Dewan Ramcomul Sen ; G. A. Prinsep, Esq.; A. D. Coull, Esq.; E. Harding, Esq.; John Jenkins, Esq.; W. Jackson, Esq.; C. Hutchins, Esq.; T. H. Gardiner, Esq.; W. Ainslie, Esq.; D. McPherson, Esq.; A. Harris, Esq.; W. K. Ewart, Esq.; J. W.

Masters, Esq.; W. F. Gibbon, Esq.; G. T. F. Speed, Esq.; C. Dearie, Esq.; John Bell, Esq., and three or four Members whose names could not be ascertained.

The proceedings of the last meeting were read and confirmed.

The following gentlemen proposed at last meeting, were duly elected Members of the Society, viz. :

F. P. Buller, Esq., C. S.; P. Barron, Esq.; F. T. Fergusson, Esq.; L. Rousseau, Esq.; Thos. Maddock, Esq., C. S.; E. Bentall, Esq., C. S.; Owen John Elias, Esq.; Jas. Church, Esq.; E. Preston, Esq.

The following gentlemen were proposed :

J. A. F. Hawkins, Esq. C. S., proposed by Colonel McLeod, and seconded by D. F. McLeod, Esq.

W. D. Shaw, Esq., proposed by Dr. Jackson, and seconded by Dr. Wallich.

G. C. Mansell, Esq., C. S., proposed by Dr. Wallich, and seconded by the Secretary.

Baboo Joykissen Mookerjee, proposed by H. Walters, Esq., and seconded by the Secretary.

A. Gouger, Esq., proposed by C. K. Robison, Esq., and seconded by the Secretary.

James Collie, Esq., proposed by C. K. Robison, Esq., and seconded by the Secretary.

R. Montgomery, Esq., C. S., proposed by the Secretary, and seconded by R. Walker, Esq.

Captain S. H. Hannay, proposed by the Secretary, and seconded by W. Storm, Esq.

G. R. Dennison, Esq., proposed by the Secretary, and seconded by W. Storm, Esq.

Alexander Porteous, Esq., proposed by Dr. Huffnagle, and seconded by W. Storm, Esq.

The following motions, of which notice was given at the last meeting, were disposed of, viz.:

1st.—Mr. Storm's motion to give premiums and medals for cows and ewes.

After reading the Committee's minutes, it was

Resolved, That a premium of 250 rupees and the silver medal be

awarded for the best bred cow imported from any part of the world, within the period prescribed in a former Resolution.

2nd.—That a premium of 100 rupees and the silver medal be awarded for the best woolled Merino or Saxony ewe, imported within the period prescribed in the resolutions already passed for the encouragement of importing bulls and rams.

3d.—That these resolutions be added to those already published.

2d.—Dr. Jackson's motion to give a premium for a certain quantity of Land cultivated with carrots, as fodder for cattle.

Some doubts being raised as to the necessity of holding out encouragement, carrots being cultivated largely in many parts of India for such purposes, the Secretary was ordered to hand this motion over to the Cattle Committee for further consideration.

3d.—Mr. Walter's motion to have the whole catalogue of premiums and medals offered by the Society, printed in Bengalee and Hindee.

Resolved, That it be adopted.

The Secretary had taken measures to have this done, and the copies will shortly be ready for distribution.

The following motions were read, and made over to the Secretary to be brought forward next month.

1st.—“Proposed by Dr. Wallich, seconded by G. A. Prinsep, Esq., that the Society's gold medal be offered to any Captain or other person who shall undertake the charge of and bring round from Bourbon, or any other place for the Society, the *true* Cochineal insect, or “grana fina,” (male and female), and who shall succeed in delivering a fair proportion of the insect in a living and healthy state; all expenses incurred to be defrayed by the Society.”

2d.—“Proposed by E. Sterling, Esq., seconded by A. Colvin, Esq., that the gold medal shall be awarded to Major Sleeman, in consideration of his zealous exertions in bringing the Mauritius sugar cane to this country, and ultimately successfully establishing the permanent cultivation of that cane on the banks of the Nerbudda.”

The President now drew the attention of the Meeting to a correspondence that had taken place between Mr. William Griffith and the Secretary, consisting of

1st.—A letter from Mr. Griffith to the Secretary, dated August 24th,

acknowledging the receipt of his election, as an ordinary member of this Society, and animadverting on the condition of the Society's Nursery, situated in the H. C.'s Botanical Garden, which that gentleman considers "unworthy of the Society, or of the Botanic Gardens ;" further giving it as his opinion, that the Committee have relied too much "on another quarter," and concludes his strictures by recommending Members to visit the Nursery and judge for themselves, suggesting at the same time that Mr. Piddington be added to the present Nursery Committee, and that the management of the Nursery be left to Mr. Masters, or, that a separate parcel of ground be rented, where the operations of the Society might be conducted "without any clog to its movements."

2d.—The Secretary's reply to Mr. Griffith, dated 26th August, explaining the nature and objects of the Nursery, which appeared to him to have been entirely lost sight of, (if at all understood) by the gentleman who had brought so grave a charge against a disinterested body ; and hoping that his explanation would tend to correct the mistaken views adopted by Mr. Griffith ; adding, however, that should they fail to do so, Mr. Bell would consider it his duty to second Mr. Griffith's proposal for the most public enquiry, and for the most unqualified opinion of Members at large.

3d.—Mr. Griffith's rejoinder, admitting only the misnomer "Experimental Garden" for a Seed Nursery, and adhering to his former opinion on all other points ; requesting that this last letter may also be submitted.

The President having read all these communications, stated, that a most grave and serious charge of neglect had been instituted against a Committee, by a gentleman whose scientific acquirements entitled his opinion to be treated with every respect by a Society to which he had been so recently elected a Member. That the Society had reposed implicit confidence in the judgment of that Committee, which consisted of Dr. Wallich, Mr. Storm and Mr. Bell, and that the *truth* of reports framed and signed by that Committee from time to time, since the establishment of the Nursery, having been impugned by a gentleman of Mr. Griffith's Botanical attainments ; he (the President) felt that the only course to be adopted, which would effectually establish or refute the accuracy of implied neglect, and consequent mismanagement, was to nomi-

nate a Committee of independent and disinterested Members (disinterested in the question at issue) who would enquire into the charges brought forward by Mr. Griffith. The following gentlemen were accordingly named by the President as a "Committee of Enquiry," and having agreed to act, were requested to bring their report up at the next General Meeting, complete on every point; viz.

W. Cracroft, Esq.; E. Stirling, Esq.; A. Colvin, Esq.; Dr. Ainslie; D. Hare, Esq.; W. F. Gibbon, Esq.; W. C. Hurry, Esq., and Robert Watson, Esq.

The President hoped that no objection would be made to accept the report of such a Committee, and none being offered, they were accordingly elected.

Professor O'Shaughnessy observed, that as Mr. Piddington had been named by Mr. Griffith, as a Member who would, in his opinion, be an acquisition to the Committee now under imputation, he thought it would be gratifying and only an act of justice to Mr. Griffith, to give him the benefit of that gentleman's judgment in conjunction with those already appointed, and the Secretary was desired to solicit Mr. Piddington's attendance, when the Committee might resolve to meet and visit the Nursery.

Dr. Hufnagle was also named, but excused himself, by saying that he could not as a Member of that Society, sit in judgment on a body of fellow-members, of whose disinterested zeal and motives he was too fully satisfied.

Dr. Hufnagle was pressed by Mr. Colvin and other Members still to join, but the President objected, as Dr. H. had so far already delivered his opinion, and he wished a full and uncompromising enquiry to be made.

Read a letter from Capt. P. T. Cautley, Superintendent of the Doab Canal, dated 6th August, acknowledging the receipt of the Secretary's letter of the 10th July, and the Carolina Rice therein alluded to. Promises to send sample of Bansmutti rice to compare with the former variety, as well as samples of each kind cultivated in the surrounding districts. Mentions his intention of sending down cuttings of the Otaheite sugar cane for the use of the Society.

From Mr. Pontet, dated Bauglipore, 16th August, noticing the cir-

cumstance of grape vines growing luxuriantly in that district in a wild state. States having distributed the cotton and grass seeds received from the Society to the hill people, who cultivate cotton in very small quantities, and of the most inferior description.

From J. Davenport, Esq., Secretary to the Branch Society at Comilla, dated 20th August, acknowledging the receipt of 3 vols. of the Society's Transactions. Speaks *favourably* of the *Upland Georgia Cotton*, and Guinea grass.

From T. O. Crane, Esq., Secretary to the Singapore Society, dated Singapore, 11th August, promising to furnish shortly a report of his exertions in the culture of cotton on the Island; requesting that an efficient *mallee* be procured and sent.

Note.—If such a person can be found, the Secretary will be happy to send him.

From H. Clarke, Esq., dated Subeswan, August 20th, intimating the establishment of a Branch Society, or rather a Botanical Garden at that station, requesting a supply of seeds, plants, &c.

Mr. Clarke reports *favourably* on the growth of *some cotton plants* produced from *Sea Island* and *Upland Georgia* seed received from this Society.

From G. H. Smith, Esq., dated Mussoorie, August 21st, acknowledging receipt of books, seeds, &c. Speaks *favourably* of the growth of three kinds of *American cotton* in his grounds at *Delhi*, and of the successful introduction of the *Otaheite* sugar-cane, of which there are now about 1,500 plants, the produce of 20 plants received a short time since from Colonel Colvin.

From W. H. Macnaghten, Esq., Secretary to Government, dated 4th September, forwarding by desire of Government, additional circulars by Dr. Wight, of Madras, containing his further remarks on Cotton.

From Dr. Wallich, dated 22d August, presenting in the name of Dr. Wight, of Madras, another copy of his observations on Cotton, also two copies of Mr. Ingledew's *Treatise on the culture of the grape vine, red rose, strawberry, &c.*

From Lieutenant Kirke, dated Deyrah, 20th August, speaking *most favourably* of his plantation of *Upland Georgia Cotton*, also the improvement visible in a plot of desee cane, cultivated after a new plan; stating

that he has found the Tartarian wheat to grow most luxuriantly in the Dhoon, that it is very prolific and makes excellent flour; soliciting a supply of *Egyptian Cotton* seeds.

From H. Walters, Esq., dated 12th September, 1837, presenting a specimen of cotton grown at Hooghly from American seed.

From Mr. Masters, dated 12th September, forwarding further supplies of cotton seeds produced in the Society's Nursery, viz. 13 seers Upland Georgia, 6 seers New Orleans, a packet of Sea Island, a ditto of Egyptian.

From R. Montgomerie, Esq., dated Azimghur, 24th August, forwarding a highly interesting statement, shewing the quantity of land under *sugar cultivation* in that district, together with an estimate of the quantity of sugar manufactured during the last year.

Note.—If all public officers would contribute in this way, (and if they knew how much such statements are appreciated, they doubtless would,) what a fund of information would not the Society shortly possess!

From W. Stevenson, Esq., Secretary to the Society of Lucknow, dated 24th August, in reply to the Secretary's letter of the 3rd July, soliciting a supply of *sugar cane*—intimates his inability to meet the wishes of the Society of India owing to a want of rain in that quarter, which will prevent the execution of prior engagements to several parties, who had applied for cane.

From J. B. Jones, Esq., dated Bucha, Jaunpoor, 11th August, mentioning the loss of a quantity of Otabeite sugar cane (obtained from the Western Provinces,) by the ravages of white ants, and soliciting a supply from the Society; stating that this description of cane has been found to answer well in the district of Azimghur, and that several nurseries have been formed in his neighbourhood, for increasing the cultivation next year.

Note.—No cane yet available from the Society's stock.

From J. W. Payter, Esq., dated Bogorah, 25th August, intimating his intention of cultivating a large portion of his lands, both neize and by ryots, with *sugar cane* (the soil being reckoned the best for that staple,) provided he can be put in the way of obtaining supplies of plant cane.

Suggesting for the opinion of the Society, the hire of a small vessel

to be sent direct to the Island of Otaheite, for a cargo of cane, the cost of the undertaking to be defrayed by a number of subscribers to a certain number of shares. Mr. Payter offers to put down 1,000 Rs. for the purpose.

Some member fancied that the sudden transition of the cane from its original soil and climate to that of India would be an insuperable objection, but this opinion was opposed by others, and the practicability of the scheme was referred to the *Sugar Committee*.

From W. Liddell, Esq., dated 10th August, (Secretary to the Agricultural and Horticultural Society of Madras,) stating in reply to Mr. Bell's letter of the 23rd July, that the Madras Government had purchased and presented to that Society, 10 Merino rams at a cost of £13, or £14 each, with a view of improving the wool, and had further most laudably given orders for the purchase of 500 white ewes. Further, in reply to Mr. Bell's enquiry respecting the plough from an American model, Mr. Liddell informs the Society, that Government have also ordered the despatch for the use of *this* Society of *ten* ploughs, manufactured at Bombay.

Mr. Liddell hopes that the Societies of Madras and Bengal will, as suggested by Mr. Bell, heartily co-operate, in respect to their endeavours to improve the wool trade.

From Mr. C. N. Villet, dated Cape Town, 8th June, advising shipment per *Perfect* of seven cases kitchen garden and flower seeds, for the use of the Society, amounting in all to Sicca Rupees 1,020, which the Secretary was directed to pay.

From Mr. J. Hannay, dated Dinapore, 24th August, advising the despatch of three cases of garden and flower seeds, for the use of the Society.

The Secretary stated, that only 25 boxes of kitchen garden and 25 boxes of flower seeds had been sent, each box containing no more than enough for one individual.

These seeds are excessively dear, and Mr. Hannay will hardly obtain further encouragement from this Society.

Resolved, that the Secretary do the best he can in the difficult matter of dividing such a wretched assortment.

From Dr. D. M. Moir, to the Secretary, dated Musselburgh, (near

Edinburgh), 20th February, acknowledging the receipt of the copies of the Transactions of this Society, and stating that he has distributed them according to the directions conveyed in Mr. Bell's letter of the 9th April, 1836—mentions the circumstance of a quantity of flax seed having been sent out to India for trial by Mr. Hastie, M. P. for Paisley.

From Mr. Veterinary Surgeon H. C. Hulse to William Storm, Esq., dated 12th August, stating that a breeding establishment for horses would be of more service to the Society than the offer of premiums for cattle and sheep.

Suggesting that a medal be awarded for the heaviest and fattest country sheep that can be produced. Referred to the Cattle Committee.

From His Excellency Sir Henry Fane, dated 22d August, expressing great doubt as to the arrival in a proper state, at Simlah, of his hop plants, newly received from England, owing to the delay that has taken place in forwarding them.

From Captain Jenkins, of Gowhatty, dated 25th July, forwarding two pieces of cloth made from the area silk, and promising to forward some cocoons soon. Ordered to be made over to the Silk Committee.

The Secretary mentioned that he had in accordance with instructions from the Society, received from Messrs. Cantor and Co. 500 rupees, the sum placed at their disposal by Captain Jenkins, as a premium. Having obeyed the Society's order, he now wished to know if Captain Jenkins ought not to have the same rate of interest allowed, as the Society received on their Company's paper. Resolved accordingly.

From Dr. W. Montgomery, of Singapore, dated 15th August, presenting to the Society a model of a rice mill commonly used at Malacca.

Ordered that the thanks of the Society be offered.

From J. J. Dixwell, Esq., dated Boston, 25th April, enclosing a bill of lading for a barrel of American maize ("the yellow dutten") shipped per *Repulse*, for the use of this Society.

From D. W. H. Speed, Esq., dated 12th September, presenting to the Society 38 ears of maize, the produce of American and of country seed.

From Mr. Harris, dated 13th September, presenting a cocoa nut from the Seychelles Island.

From C. K. Robison, Esq., dated 12th September, on the subject of having a new die for medals.

Ordered that the Medal Committee be requested to report.

The thanks of the Meeting were ordered to be offered for the foregoing communications and presentations.

The Secretary brought to notice, that the next month's *regular* meeting day would fall just in the middle of the Doorgah Poojah Holidays; when most of the members would be out of town; and suggested that an earlier day should be fixed, as it was highly desirable, that the report of the "Committee of Enquiry" should be brought up, and published without delay, as the Nursery Committee's hands had been tied since the receipt of Mr. Griffith's letters, and its objects would be frustrated by any delay.

Resolved, that the *first* Wednesday in October, be fixed for the next General Meeting of the Agricultural and Horticultural Society of India.

ADDENDUM.

Dr. Huffnagle presented some samples of twist and cloth made from American acclimated cotton, of very superior quality.

Agricultural and Horticultural Society of India.

A General Meeting of this Society was held at the Town Hall, on Tuesday morning, the 3d OCTOBER, at $\frac{1}{2}$ past 9 o'clock.

Present.

The Honourable Sir E. Ryan, President, in the Chair.

The Honourable Col. Rehling; Dr. Wallich; Col. D. McLeod; Capt. Carter; E. Sterling, Esq.; W. Cracroft, Esq.; W. Storm, Esq.; D. F. McLeod, Esq.; C. De Verinne, Esq.; R. Watson, Esq.; A. Colvin, Esq.; G. F. McClintock, Esq.; W. Ainslie, Esq.; Professor O'Shaughnessy; Dr. Huffnagle; Dr. Drummond; Dr. Jackson; Dr. Egerton; Samuel Smith, Esq.; Dr. Goodeve; A. Grant, Esq.; W. C. Rose, Esq.; J. M. Sepings, Esq.; Nawaub Tohowerjung; R. Walker, Esq.; W. Bracken, Esq.; R. J. Bagshaw, Esq.; F. T. Fergusson, Esq.; John Allan, Esq.; M. S. Staunton, Esq.; M. A. Bignell, Esq.; G. A. Prinsep, Esq.; J. H. Stocqueler, Esq.; W. K. Ewart, Esq.; M. M. Manuk, Esq.; J. B. Higginson,

Esq.; W. Jackson, Esq.; D. Hare, Esq.; G. F. Speed, Esq.; C. Trebeck, Esq.; W. F. Gibbon, Esq.; T. H. Gardiner, Esq.; D. McPherson, Esq.; T. Leach, Esq.; Col. Caulfeild; Dr. Strong, and two or three members, whose names could not be ascertained.

Visitors.:—Captain Pemberton, introduced by Col. McLeod; Dr. Bennet, of Paris, introduced by Dr. Wallich; and Dr. McCosh, introduced by Dr. Strong.

The proceedings of the last Meeting were read and confirmed.

The following gentlemen proposed at the last meeting were elected members of the Society.

J. A. F. Hawkins Esq., C. S.; W. D. Shaw, Esq.; G. C. Mansell, Esq., C. S.; Baboo Joykissen Mookerjee; A. Gouger, Esq.; R. Montgomery, Esq.; C. S.; Jas. Collie, Esq.; Capt. S. H. Hannay; Alex. Porteous, Esq., and G. R. Dennison, Esq.

The following gentlemen were proposed, viz.

H. C. Tucker, Esq., C. S.; proposed by the Secretary and seconded by Dr. Wallich.

James Fergusson, Esq., proposed by the Secretary and seconded by Dr. Wallich.

J. A. Dorin, Esq., proposed by the Secretary and seconded by G. F. McClintock, Esq.

Thos. Holroyd, Esq., proposed by Sir E. Ryan, and seconded by Dr. Wallich.

Charles Bury, Esq., C. S., proposed by W. Hickey, Esq., and seconded by Col. Caulfeild.

Captain R. B. Pemberton, proposed by Col. McLeod, and seconded by Captain Carter.

Baboo Cossinauth Bose, proposed by G. A. Prinsep, Esq., and seconded by Dr. Jackson.

J. H. D'Oyly, Esq., C. S., proposed by H. Walters, Esq., and seconded by the Secretary.

W. Luke, Esq., proposed by T. Leach, Esq., and seconded by W. W. Kettlewell, Esq.

Manickjee Rustomjee, Esq., proposed by Dr. Jackson, and seconded by Professor O'Shaughnessy.

A. H. Sim, Esq., proposed by W. F. Gibbon, Esq., and seconded by W. Ainslie, Esq.

Lieut. W. Abercrombie, proposed by W. F. Gibbon, Esq., and seconded by W. Ainslie, Esq.

G. A. Dyce, Esq., proposed by W. F. Gibbon, Esq., and seconded by W. Ainslie, Esq.

Read a letter from R. Montgomery, Esq., to the Secretary, dated 12th September, (Azimghur), promising to send replies to the Agricultural Queries transmitted to him in a former letter. Asking for supplies of cotton, tobacco, clover, lucern, and guinea grass seed. Speaks *favourably* of the *Otaheite sugar-cane* plants received from Jubbulpore, and planted out last cold season.

From D. F. McLeod, Esq., of Seonee, dated *Calcutta*, September 18th, presenting specimens of three varieties of country cotton, called "*Munnooa*," "*Deo*" and "*Berar*," and of the produce of Egyptian cotton seed, received from this Society in May, 1836. Also, the flower and leaves of a large tree, the growth of Seonee, the bark of which is said by the natives, to possess great febrifugal powers.

The Munnooa (green seeded) and the Deo, (black seeded) are stated by Mr. McLeod, to be perennial plants, yielding their cotton in the hot weather, and not as the common country annuals, at the close of the rains. These varieties are planted by the natives near their dwellings, with a view to shelter, and the produce is chiefly used for making Brahminical threads. The Munnooa is also cultivated extensively in fields on the ranges east of Mirzapore. Mr. McLeod regards these specimens as very inferior, owing to the excessive rains which fell in that part of the district.

The Berar cotton is sent merely as a subject of comparison, having been obtained from a native at Hingun Ghat. Mr. McLeod speaks favourably of the appearance of the *Peruvian* cotton plants, from seed also forwarded by this Society, but the pods were not ripe, when he left Seonee.

The flowers and leaves of a large tree also accompany this parcel. This tree is stated, according to tradition, to have been planted by a wandering fuqueer, and its bark, as already observed, is supposed to contain medicinal virtue.

From Dr. A. Campbell, dated Nepaul, 5th September, 1837, presenting for the use of the Agricultural Society, a bottle of white clover seed

from a crop grown by Mr. Hodgson. Dr. Campbell mentions the fact of the famous "*Pangass*" of Thibet, having seeded at Nepal.

From Dr. Wallich, dated 21st September, annexing an extract of a letter to his address, from H. Chamier, Esq., dated Madras, 6th September, 1837, in reference to Mr. Liddell's letter of the 10th of August, read at the last meeting of this Society.

Mr. Chamier says—"I have lately introduced a new plough of a simple construction, without coulter and exceedingly light, so much so as to be easily drawn by two common bullocks; remarkably handy also, and turns over a very large quantity of soil. They are made at the Porto Novo works at ten rupees, without the wood work, for which another six rupees is demanded. Our Government seeing what an efficient implement it is, has ordered 800 for distribution in the interior, and the Bombay Government has ordered 400. They should be widely introduced in Bengal."

From Dr. Wallich, dated 26th September, annexing extract of a letter from the Honourable Mr. Melville, dated Berhampore, 22d September.

"I send a few mangoes just ripening from two trees in a garden here; as Mr. Laidly tells me the fact of this September crop, however well known here, is new to you. He or I will try to send you some plants in the season."

From Dr. W. Montgomerie, dated Singapore, 31st August, acknowledging the receipt of the Secretary's letter of the 25th July, and in reference to it has been kind enough to forward by the *Water Witch* one hundred canes of the same kind as those already sent by the *Guillardon*.

Dr. Montgomerie has not been able to ascertain any thing satisfactory relative to the origin of the canes grown at Singapore; "they form part of the *Sea Stock* of almost all native vessels, and as we have communication with all the *East* by such means, we may have got them either from Siam, Borneo, Celebes, Java, or any other neighbouring country. The natives recognize the red or purple cane as the "*Tuboo Malacca*"—pointing out Malacca as the place of origin, but they *think* the three light coloured varieties, viz. "*Tuboo Leab* or *Leeal Tuboo*, *Tuboo* and *Kapur* have been introduced by the Buggese trader from the Eastern Islands, and in such case they may most probably be a variety of the

Otaheite cane modified by the Malay, which may have been cultivated by the natives."

From W. Kerr Ewart, Esq., the Report of — Elliot, Esq., head assistant to the Collector of Salem, embodying many interesting details on the subject of experiments made with American Cotton seed sent out by the Honourable Court of Directors some years ago, as well as much valuable information on Tobacco, Senna, and soils—grasses and sub-soils, chaya, and other dyes to be found in the talooks of Dhermapuri and Moomalur.

From Dr. Wallich to the Secretary, dated 2d October, giving cover to a letter to his address from Captain Jenkins, of Assam, dated 21st September, forwarding two samples of lac (stick lac), and suggesting that they be handed over to Professor O'Shaughnessy for his opinion as to quality, and the distinguishing character of the lac, with reference to the tree on which the insects are fed.

From Charles DeVerinne, Esq., some specimens of the *Upland Georgia Cotton*, grown at Calipool, Jessore. The following memorandum accompanies this cotton.

Season 1836-37.

Three biggahs and 18 cottahs of land fenced in for American cotton, sown with Upland Georgia and New Orleans Cotton Seed on the 18th, 19th, 24th, 30th, and 31st May. Commenced budding and flowering in the end of July, and the fresh pods of ripe cotton were gathered on the 18th September, 1837.

Charges on the above.

23 Ploughs, at 12 per Rupee,.....	1	15	3
100 Bamboos for fences,	5	0	0
44½ Coolies for fencing,	3	11	6
86 Ditto, for sowing,	7	2	6
2 Gharamies,	0	3	6
Land rent, at 12 per biggah,	2	12	6
99 Coolies, weeding ditto,	8	4	0
	Rs.	29	1 3
But we may dispense with the expence of } bamboos and fencing, which would not be in- } volved on a large establishment, }		8	11 6
Charges on 2 biggahs and 18 cottahs,	Rs.	20	5 9

If Mr. DeVerinne will follow up this interesting experiment, and give the Society the result, when the crop has been taken off, he will be rendering an essential service to the cause of improvement, and we doubt not, from Mr. J. M. DeVerinne's known accuracy and experience, that the Society will obtain what is so earnestly desired.

From Charles DeVerinne, Esq., a very fine specimen of the "lime" fruit, taken from a tree transplanted by Mr. Rowe, of Channerundee Factory, in the same neighbourhood into his garden from the jungle, where it was growing spontaneously and producing limes of very diminutive size. By degrees, and fostered by attention, the bush has produced abundant fruit of equal size as the specimen now presented. Nothing can be more encouraging to demonstrate how materially *all* indigenous fruits may be ameliorated by judicious pruning and management.

The following correspondence between Mr. W. Griffith, Assistant Surgeon on the Madras Establishment, and the Secretary, which was read at the last General Meeting, is now published as an accompaniment to the report of the Committee of Enquiry, called to report on the subject of Mr. Griffith's remarks or charges.

No. 1.

To JOHN BELL, Esq.

Secretary to the Agricultural and Horticultural Society.

Sir,—I have the honour of acknowledging the receipt of your letter, informing me of my election as an ordinary member of the Society.

For payment of the requisite sums, may I beg to refer you to Messrs. Willis and Earle.

For the remainder of this communication some apology is necessary, particularly as I believe a Committee was appointed some time ago to superintend the experimental garden, allotted to the Society in the Botanic Garden. I trust, however, that I shall be excused for trespassing on the province of the Committee alluded to, whose report, I hear was favourable. My only wish is that several of the members will go, and examine the matter for themselves, as my own visit was attended with a decidedly unfavourable impression.

The garden or nursery is really in a condition unworthy of the Botanic Garden. It may, in fact, be considered to be a mere jungle, and the experiment to be, not to produce cotton, &c. of fine quality, but to ascertain how close plants can grow together; and to what degree of privation of free circulation of air they can submit to from being closely surrounded by trees.

The cause of its bad state, is, I conceive, that the Committee place too much reliance on another quarter.

The remedy I would respectfully beg to suggest, is, the placing the nursery, as far as may be possible under existing circumstances, under the charge of Mr. Masters, whose merits as a theoretical and practical gardener are well known to all, and that in addition, Mr. Piddington be requested to become a member of the Committee.

If with the advantage of a Government establishment, the Society's experimental garden fails so signally, I would respectfully beg to suggest the propriety of renting some land, where at any rate the Society could act without any clog to its movements.

I have, &c.

(Signed) WILLIAM GRIFFITH,

Calcutta, August 24, 1837. Member of the Agricultural Society.

P. S.—I anticipated the pleasure of bringing this subject to the notice of the Society personally, but I am prevented from doing so, by being obliged to leave Calcutta immediately for Assam.

No. 2.

TO WILLIAM GRIFFITH, ESQ.

Sir,—I have the honour to acknowledge the receipt of your letter of the 24th instant, referring me to Messrs. Willis and Earle for the payment of your subscription to the Society, which shall be duly observed.

2.—Adverting to the latter part of your communication, I beg leave to offer some explanation which may or may not remove what appears to me, the erroneous impression you have adopted of the Society's intentions in regard to the maintenance of a Nursery, situated within the boundary of the Honourable Company's Botanical Garden. After which, should you still consider it desirable, I shall, of course, submit, at the next general meeting, your letter, with a copy of this address.

3.—You are correct in your belief, that a Committee was appointed some time ago, to superintend operations in the quarter alluded to, and you are also correct in having heard, that the last report of the Committee was (as all their reports have been) “favourable,” favourable in as much as the direct objects of the Society are concerned.

4.—But you are *not* correct in calling the Society’s Nursery an “*experimental garden*,” and this confusion of terms has probably led you to arrive at the conclusion, that the Committee have betrayed the trust reposed in them, by the Society:—for if it can be said, that the Nursery is in a condition unworthy of the Society, it follows, as a matter of course, that the Committee have been lax in their duty; and merit the imputation which is conveyed in your remarks of their proceedings, and I am quite sure, that my colleagues will be as scrupulously anxious to court public opinion, as I shall be to place the question beyond the slightest doubt.

5.—The creation of the Society’s Nursery emanated from a suggestion of mine, communicated in a letter to the President, which was read at a General Meeting on the 9th March, 1836, which had for its object, the renting of a parcel of ground to the extent of 6 beegahs, to be fenced in and dug *for the reception of Otaheite sugar-cane, then expected from the Mauritius for the purpose of increasing the stock before distribution to applicants throughout the interior*; but the President observed, that although the necessity of having some available ground for the purpose was indisputable, some objection might be raised on the score of expense, as ground so situated (I wanted it near Calcutta) would require to be well fenced and constantly watched. This objection was met by the suggestion of several members present, who, with reference to the perfect willingness expressed by the superintendent of the Botanical Garden, before the departure of that gentleman for Assam, not only to spare room in the vicinity of the garden, but to give the Society the benefit of his general supervision, should they desire it; the meeting resolved that I, as Secretary, should place myself in communication with Mr. Grant, then acting superintendent, and solicit a portion (6 beegahs) for the purpose above alluded to; and that Mr. Masters, who was present, and offered his aid in behalf of the undertaking, should be requested to point out a plot, and favour the Society with an estimate of the

probable cost of maintaining it in proper condition. It further appears in the proceedings of the 30th April, 1836, that I had met Mr. Masters to whom I was referred by Mr. Grant, who met the Society's wishes and pointed out a parcel of ground, which in Mr. Master's opinion, was well suited for the purpose, and which he stated had been the site of Dr. Roxburgh's experimental garden.

Having concurred in this arrangement, the *nucleus* of the present nursery was formed by two sugar-canes, the only ones alive, out of 100 canes received from Bombay, (vide Mr. Master's letter to me of 25th April.)

Our expected supplies of cane from the Mauritius were lost with the *Vicissitude*, the vessel in which a large assortment had been shipped, and we were equally disappointed in our expectations from Lucknow, the canes sent by Dr. Stevenson having arrived parched up, and all the eyes rubbed off.

The ground having been prepared at a considerable expense, the Committee conceived that it might be applied to other useful purposes, and it was accordingly resolved in Committee to apply it to the reception of all seeds and plants arriving out of season, to secure, if possible, the produce, even under the disadvantage of planting out of season which would otherwise, in all probability, be lost to the country.

In accordance with this resolution, three descriptions of American cotton seed received through the agency of Dr. Huffnagle were received about the latter end of last September. I do not know the exact dates of planting, but it must have been shortly after this that some of each was sown in the nursery. On the 10th December when the Committee visited the nursery, this cotton seed had been planted out into rows, and *with reference to the lateness of the season* was reported to be most vigorous. From this plantation the Committee expected to derive "*an abundant supply of seed, to secure which is now a great desideratum.*"

At a General Meeting of the Society on the 12th ultimo, Mr. Masters submitted 10 seers of Upland Georgia, and 4 seers of New Orleans cotton seed, the produce of the Society's Nursery, I believe the produce of seeds imported through Dr. Huffnagle, for I have not *data* by me.

Thus it seems that the objects of the Society run counter with your

opinion, for the Committee never dreamed of planting cotton seed with a view to experimenting on its *quality*, the Society having long before given to the public their report upon experiments carried on at *Akra*. The views of the Committee were directed to securing *seed* to distribute, seeing that much disappointment had attended former attempts to introduce, on a large scale, the American cotton, from the difficulty experienced of procuring it in sufficiently fresh condition, and with these facts before me, I feel that the remarks you have made are misapplied, and contain reflections upon the efforts of the Committee which I hope this explanation will tend to remove ; not that I desire to blink enquiry, for the Reports of the Committee, from first to last having been drawn up by me, I feel anxious for the most unqualified expression by other Members, as to their accuracy ; and should this letter not be entirely satisfactory, I shall consider it my duty to second your proposal to invite members to judge for themselves, and I mistake the character of my colleagues, if they will not be equally anxious to wipe off the imputation which you have cast upon them.

6.—The remedy you have been pleased to suggest, is, if I mistake not, now in full force ; the charge of the nursery has been with Mr. Masters from the beginning, and he has had the thanks of the Committee recorded on several occasions for his exertions in bringing it to its present state, which in my humble opinion is not a jungle, but well cultivated to secure the end for which it was designed, viz. the augmentation of our sugar-cane stock ; and the maintenance of vitality of such seeds and plants, as arrive out of season ; which are frequently lost to the country from being kept until the proper season of sowing such seeds is supposed to have arrived.

I have, &c.

(Signed) JOHN BELL,

Secretary Agri. and Horti. Society.

*Agricultural Society's Office,
Calcutta, August 26, 1837.*

TO JOHN BELL, ESQ.

Secretary to the Agricultural and Horticultural Society.

SIR,—After reading the address with which you favoured me on the 26th instant, I beg to say that my opinions remain unaltered.

It would seem that the principal error I have committed, consists in mistaking the Society's *Nursery* for an *experimental Garden*.

Your remarks have not convinced me, that care is not necessary in order to procure the best sorts of seeds, the quality of which will depend very considerably upon the healthy constitution of the individuals from which they are derived—such, indeed, it is impossible to obtain, in my opinion, unless the Nursery undergoes a considerable alteration for the better.

I have not the pleasure of knowing any member of the Committee, appointed by the Society to report upon the condition of the Nursery, but if these gentlemen are not professed Agriculturists, it cannot, I presume, be construed into a reproach, that they should have been mistaken in the matter—more especially as they may have naturally conceived the situation of the plants in a Botanical Garden to be a sufficient guarantee for their proper treatment.

I have, &c.

(Signed) W. GRIFFITH,

Calcutta, 29th August, 1837.

Member.

P. S. Should you consider it necessary to read your address to the Society at its next meeting, may I request that you will read the present communication also.

This ends the correspondence, and in accordance with the resolution passed at the September General Meeting of this Society—a “Committee of Enquiry” was appointed, whose report upon the accuracy of Mr. Griffith's charges—as read by Mr. Cracroft, is as follows:

REPORT.

Proceedings of a Committee of the Agricultural and Horticultural Society, held at the Town Hall, Calcutta, on the 28th September, 1837.

1.—The members of this Committee delegated by the Society to ex-

amine and report upon the state of their Nursery in the Honourable Company's Botanical Garden, in consequence of the management thereof having been impugned in a letter from Mr. Griffith, a member of the Society, met this day at 12 o'clock (with the exception of Mr. Piddington and Mr. Hurry) having previously at various times visited the nursery.

2—The members of the Committee unanimously concurred in the following remarks. The cotton plants had been put in the ground originally, at the distance of 3 feet and upwards. In some few places where the seed has failed, the plants are at greater distances, but the Committee observed, that no particular benefit had been derived by the plants thus accidentally supplied with additional space; the ground was perfectly free from weeds, &c., and in every respect well attended to, and the plants altogether in a healthy and flourishing condition. The Otaheite sugarcane was in the most flourishing state, as well as the mulberry plants from cuttings of various sorts, also the vanille, caloe hemp, ginger and other plants in the nursery.

A large piece of ground has also been trenched from end to end, and is in a most perfect state for the reception of future importations.

3.—The members of this committee are of opinion that the thriving state of the garden in general, and particularly the sugar cane and cotton plants, fully demonstrate that Mr. Griffith must have fallen into some great error, or viewed through a distorted medium, not only the state of the garden but also the intentions and views of those gentlemen, more especially engaged in superintending it. The members of this Committee have also resolved, that instead of too great a reliance having been placed in any 'particular quarter,' or the exertions of the Society having been 'clogged' (in regard to which expressions of Mr. Griffith this Committee think proper to express both their surprise, regret, and disapprobation) they, on the contrary, earnestly recommend that the implicit confidence hitherto reposed in the nursery Committee be continued, if possible, more firmly than hitherto. The Committee have further ascertained that instead of any thing like a 'clog' existing, a cordial co-operation and reciprocal interchange of opinions and an uniformity of views have subsisted between those whose immediate superintendence and management have been the cause of the present flourishing condition of the nursery.

Part Proceedings of a General Meeting of the 3rd. October, 1837.

(Omitted in Vol. 5, Transactions, at Page 75, Proceedings.)

The Report having been read by Mr. Cracroft, Chairman of the Special Committee,—it was

1st.—Proposed by the Honorable Col. Rehling, and seconded by Dr. Jackson,—That the same be confirmed, which was carried unanimously.

2nd.—Proposed by Sir E. Ryan, and unanimously resolved,—That the Secretary be requested to send Mr. Griffith a copy of this Report.

3d.—Proposed by Professor O'Shaughnessy, and unanimously assented to by the Meeting,—That the Correspondence which led to the formation of the Committee of Enquiry, together with the Report, be published at full length.

4th.—Proposed by Mr. Cracroft, seconded by Sir E. Ryan,—That the Society do request the Members of the Nursery Committee to continue their labours. Carried *nem con.*

N. B.—These Resolutions have been regularly entered in the Office Records, and printed in the precis of Proceedings which appeared in the Daily Journals—the omission in Vol. 5, Transactions, is only to be accounted for in the rapidity of publication by the Serampore Press.

JOHN BELL,
Secretary.

August 22nd, 1838.

4.—The members of this Committee feel themselves called upon to declare, that in a very close examination of the garden, nothing came under their notice to palliate, much less to warrant or justify the imputations and insinuations contained in the letter referred to them for consideration.

5.—Finally, the members of this committee are happy to have it in their power to state their opinion, that the Society have nothing further to wish for, than that those gentlemen who have already paid so much praise worthy care and attention to the objects confided to them, will continue to bestow their valuable aid in forwarding the views under which, this nursery was established, viz., to raise seeds and nurse plants received at seasons unfavourable for their distribution, and to preserve the produce of the garden until proper seasons and favourable opportunities for distributing the benefits of it may occur; and the Committee on their own part, express their hope that the present members of the nursery Committee will not permit any unpleasant feelings which may have arisen, from finding their conduct and motives thus unnecessarily impugned by a single individual, to induce them to discontinue their meritorious and valuable exertions.

Present.

(Signed) W. Cracroft.

W. Ainslie.

Alex. Colvin.

Robt. Watson.

(Signed) E. Sterling.

W. F. Gibbon.

D. Hare.

The President here addressed the Meeting at some length, observing that on the subject of Mr. Griffith's charge being brought forward, he had adopted that course which he conceived, would afford the greatest satisfaction to both the gentleman who had impugned the Committee, and to the members who composed it. It had certainly been mentioned by several members at the last meeting, that the charge appeared unworthy of so much attention, but he thought otherwise. Mr. Griffith was known to many of the Indian community as a gentleman whose opinion might be considered deserving of every respect, and, however unpleasant to the feelings of the Committee, he (the President) was anxious to place the question at rest on such grounds as could admit of no subsequent doubt, and the issue was such as to enable him, on the report

of an independent and unbiassed body of gentlemen, to congratulate the members of the Nursery Committee, on the assurance of the utmost confidence in their past exertions, while the only individual who might feel uncomfortable as to the result, would be Mr. Griffith himself.

Dr. Wallich rose to express on his own behalf, as well as that of his colleagues in the Nursery Committee, their entire satisfaction with the report that had just been read. He begged to return their best thanks for the patient investigation that had been entered into, and which had more particularly implicated him in the charge made against the management, which called for his thanks in an especial manner.

Mr. Bell expressed himself to the same effect. The President then alluded directly to the Committee's continuing their services, when Dr. Wallich observed, that after what he had expressed, it was hardly necessary to assure the meeting that the Nursery Committee would continue their labours with unabated zeal, as they had the interests of the Society, and those only at heart.

Dr. Wallich's motion to offer a premium for the importation of the true Cochineal insect in a living state from any part of the world, was brought forward and carried. Mr. Prinsep, who had seconded the proposition, having been asked, consented to add a note to obviate mistakes in bringing any other than the domesticated coccus, (for particulars, vide last month's proceedings).

Mr. E. Sterling's motion to present Major Sleeman with the Society's gold medal as a slight acknowledgement of the estimation in which the exertions of that gentleman were held, for his public spirit in introducing and distributing largely the Otaheite sugar-cane brought by him from the Mauritius, was next in the list.

Mr. Sterling adverted at some length to the zeal, and disinterested motives which had prompted Major Sleeman to make such a sacrifice of his time and means, for the benefit of this country, quoting several passages from the Transactions of the Society, in proof of the undeniable success of his endeavours, and after eulogizing in emphatic terms, the example so nobly set by this gentleman, hoped that his motion would meet the unanimous voice of the Society at large.

Mr. A. Colvin heartily seconded this motion; it was a very inadequate acknowledgement for all Major Sleeman had done, nevertheless it was a

proof which could not be but gratifying to Major Sleeman, of the estimation in which he was held by this Society, as a public benefactor, and as one of its most zealous members.

Received with applause, and resolved unanimously, that Major Sleeman be presented with the gold medal, accompanied by the sentiments of the Society.

The following notices of motions were read and handed to the Secretary to bring up at next meeting.

1st. Proposed by Dr. Jackson, seconded by Mr. Bell.

"That in order to afford the fullest means of information to the members of the different Committees on the subject of their various researches and matters of enquiry, each Committee be furnished with the best standard works in their particular departments, and that the members of each Committee be invited to prepare a list of such works as they may think it advisable to have access to for consultation on occasions of reference, and to submit such list for the consideration of the Society at the next meeting."

(Ordered to be submitted to the Committee of Papers.)

2nd. Proposed by Captain Carter, seconded by Mr. Cracroft.

"That a reward of 500 rupees and the gold medal be awarded to any person who shall successfully domesticate in the plains, any indigenous (or wild) *Honey Bees*, or introduce the species already domesticated in the mountains to the north and north east, or import the European or any other foreign Honey Bee. It will be required that the claimant shall satisfy the Society that the experiment has been successfully continued for more than one year, and not less than three full hives be shown, obtained by second swarming from the domesticated or imported hives, and that he shall furnish a particular report of the method by which he arrived at the successful result.

(Referred to the Committee of Agriculture.)

The thanks of the meeting were ordered to be given for all the foregoing papers and presentations.

At a Meeting of the Nursery Committee of the Agricultural and Horticultural Society, held at the residence of Dr. Wallich, on the afternoon of the 8th September, 1837.

Present.

Dr. Wallich.

W. Storm, Esq.

John Bell, Esq.

Mr. Bell having read a correspondence which had taken place between him and Mr. Griffith, consisting of a letter addressed by Mr. Griffith, dated August 24th, Mr. Bell's reply, dated August 26th, and Mr. Griffith's rejoinder, dated August 29th, both of which letters from Mr. Griffith animadverting on the condition of the Society's Nursery, and the management of the same,—the Committee proceeded to inspect the Nursery, and found it in such a state, as to justify the favourable opinion which they had formerly expressed.

The Committee, adverting to one part of Mr. Griffith's letter, have to observe, that the Cotton seeds arrived out of season, and were first sown in beds, and afterwards transplanted, and that they never expected so many of them would have thriven, or that they would produce so much seed, considering the time of the year in which the Cotton was planted (October).

The productiveness of the plants has so far exceeded the Committee's expectation, that they could not have taken measures for thinning, without injuring the produce of seed, which was, in fact, the only object of the plantation; the best proof of the success of the undertaking is in the seed itself which has been yielded, and is now submitted to the Society for inspection and contrast.

While on the subject of Cotton the Committee may remark, that it was never contemplated to establish a Nursery for the production of Cotton, the sole object being to obtain *fresh* supplies of seed for general distribution, as fully explained in the Secretary's letter, quoted above. With regard to the distance of the plants from each other, the Committee feel that they cannot do better than quote Dr. Ure's late work on Cotton.

"The fields should be entirely shaded from the sun, when the plants are full grown ;—the distance between their roots should be adapted to circumstances ; while thinning and hoeing to remove weeds, the earth

"should be well gathered round the roots; the number of workings, hoeing and earthing of the roots seldom exceed six, the last about six weeks before the crop begins."

"In general the plants which grow about 3 feet high, are left 10 inches apart, if 4 feet high, one foot apart, if six feet high, 2½ feet apart."

The Committee beg to observe that none of the Cotton plants in the Nursery are less than 2 feet apart, most of them 3 feet, and that in height none exceed 4 feet.

In respect to the *Sugar-cane*, the Committee are of opinion that it could not be in a more healthy or thriving state.

They have much pleasure in stating that the West India Ginger, which was presented to the Society by Mr. Bell, is in a most flourishing condition, and that they hope to be able from this nucleus, to spread the cultivation of this very superior article.

On referring, through the Secretary, to the disbursements from the first formation of the Nursery, from the 1st May, 1836, till the end of July, 1837, being a period of 15 months, the Committee find that the total expenditure amounts to 508 Rupees, or, on an average, to about 30 Rs. per month, out of which 76 Rs. have been expended for lime and various implements, an expenditure which will not be again incurred for a considerable period.

This scale of charges may be considered moderate; but it must be recollected, that, of course, there is nothing incurred for rent or management.

The Committee have at length succeeded in obtaining the long promised supply of oil-cake from Fort Gloster, which they anticipate will materially improve the soil of the Nursery. A portion has already been applied to the Sugar-cane and Cotton, and the remainder is reserved in the hope of speedily receiving supplies of Sugar-cane from Singapore and Bourbon.

The Committee are of opinion that the condition of the Nursery is as promising as could be expected from the limited expense entailed,—the unexampled severity of the past season; and the unfavourable period at which the seeds and plants were required to be put in the ground.

N. WALLICH, M. D.

W. STORM.

JOHN BELL.

A Meeting of the Nursery Committee, took place at Dr. Wallich's residence, Botanical Garden, on Friday afternoon, the 22nd September, 1837.

Present.

Dr. Wallich,
W. Storm, Esq.
John Bell, Esq.

The Committee proceeded to visit the Nursery, which continues in a thriving condition.

The North American Cotton plants having yielded seed abundantly, and appear now to be dropping their leaves, the Committee have thought it advisable, and have resolved accordingly, that if, at the end of eight days, the remaining buds do not increase in size sufficiently, to warrant them to remain, they are to be cut down, (reserving a small plot of each kind) to within 6 inches of the ground, in order to see what effect the cutting will have on the produce of seed next season, contrasted with that derived from the plants allowed to remain as they are, and provided the Committee do not, in the mean time, obtain supplies of sugar-cane, for the reception of which, all other seed crops must, of course, give way.

The Egyptian Cotton plants are now in full vigor, and being yet covered with blossom, the Committee have determined to let them remain as they are for the present.

The sugar-canes are looking very well, and though planted at a great distance, are now sending out a great many lateral suckers; these the Committee attribute to the Cane being planted, as received, out of season, and as the large Canes now attaining maturity will choak up, and impede the progress of the young shoots, the Committee have determined to take from the stoles, all the shoots that can be removed without injury to the parent stock, and so increase the extent of the Cane Nursery.

Resolved,—That the China Paper plant, the Mulberries, and Caloe Hemp, be cut and planted out in the new ground lately prepared.

W. STORM.
N. WALLICH.
JOHN BELL.

Agricultural and Horticultural Society of India.

A General Meeting of this Society was held at the Town Hall, on Wednesday morning, the 8th November, 1837, at $\frac{1}{2}$ past 9 o'clock.

Present.

The Honourable Sir E. Ryan, President, in the Chair.

The Honourable Col. Rehling, W. Cracroft, Esq., W. Storm, Esq., A. Colvin, Esq., W. Ainslie, Esq., Dr. A. R. Jackson, R. Watson, Esq., John Allan, Esq., Dr. Huffnagle, E. Sterling, Esq., A. Grant, Esq., J. Colquhoun, Esq., Dr. Strong, D. W. H. Speed, Esq., D. B. Syers, Esq., Dewan Ramcomul Sen, W. Jackson, Esq., R. Walker, Esq., D. F. McLeod, Esq., N. B. E. Baillie, Esq., D. Hare, Esq., W. F. Gibbon, Esq., A. Beattie, Esq., G. A. Prinsep, Esq., E. Preston, Esq., T. Leach, Esq., G. F. Speed, Esq., M. A. Bignell, Esq., W. K. Ewart, Esq., M. M. Manuk, Esq., J. Jenkins, Esq., C. Trebeck, Esq., John Bell, Esq.

Visitors.—Mirza Mahomed Mehdi Meski, introduced by Dewan Ramcomul Sen; James Davenport, Esq., introduced by Dr. Strong; Capt. H. Drummond, introduced by W. Cracroft, Esq.

The proceedings of last meeting were read and confirmed.

The following gentlemen proposed at the last meeting, were duly elected members of the Society.

H. C. Tucker, Esq., C. S., James Fergusson, Esq., J. A. Dorin, Esq., Thomas Holroyd, Esq., Charles Bury, Esq., C. S., Captain R. B. Pemberton, Baboo Cossinauth Bose, J. H. D'Oyly, Esq., C. S., W. Luke, Esq., C. S., Munickjee Rustomjee, Esq., A. H. Sim, Esq., Lieut. W. Abercrombie, E. A. Dyce, Esq.

The following gentlemen were proposed, viz.

Meer Abbas Ali Khawn, proposed by H. Walters, Esq.; C. G. Millman, Esq., proposed by D. B. Syers, Esq.; E. A. Blundell, Esq., proposed by Sir E. Ryan; Mirza Mahomed Mehdi Meski, proposed by Dewan Ramcomul Sen, and J. S. Torrens, Esq., C. S., proposed by R. H. Cockerell, Esq., seconded by the Secretary.

C. Garstin, Esq., C. S., proposed by James Colquhoun, Esq., seconded by T. Maddock, Esq.

Captain W. M. Stewart, (Chunar), proposed by A. Beattie, Esq., and Captain H. Drummond, proposed by W. Cracroft, Esq., seconded by Dr. Strong.

W. G. Maxwell, M. D., and Lieut. W. C. Sibly, H. M's. 26th Regt., proposed by the Secretary, seconded by W. Storm, Esq.

REPORTS.

1.—On Dr. Jackson's motion made at last meeting, to allow each Committee to procure such standard books, as might be useful in coming to an opinion on questions submitted to their consideration.

The Committee recommend the adoption of Dr. Jackson's motion ; and it was resolved,

That Members of Committee will send in the names of books required to the Secretary, who will procure them on the authority of the Committee of Papers.

Resolved,—That the Committee's Report be adopted in regard to other points therein referred to.

2.—On the motion of Captain Carter, touching a premium for the domestication of bees in the plains.

The Agricultural Committee to whom this question was referred, recommend that the proposal be allowed to lay over until they shall have collected more specific data.

Resolved,—That the Committee's recommendation be adopted.

3.—The Secretary read the report of the Nursery Committee, which described the Nursery to be in a promising condition, the sugar-cane plantation progressing both in vigour and extent from multiplying the plants by cuttings, &c. The Committee express a desire to have the number of members, increased both on the Nursery Committee and the Committee of Papers.

Resolved,—That the Nursery Committee's report be adopted, and with reference to the request of the present Committee, that the following gentlemen be solicited to give their assistance.

The President proposed the following :—

Dr. Huffnagle, W. F. Gibbon, Esq., and Captain Leach, additional Members of the Nursery Committee, and

W. Cracroft, Esq., M. A. Bignell, Esq., and W. K. Ewart, Esq., additional Members of the Committee of Papers.

4.—Report upon specimens of *Caoutchouc* forwarded by Dr. Helfer and by Captain Jenkins, the latter made under the directions of Lieutenant Vetch.

Resolved,—That the Committee's report be adopted and printed forthwith in the Transactions.

5.—Report upon the Tea Plant of Assam, by W. Griffith, Esq., accompanied by drawings and maps.

Resolved,—That Mr. Griffith's report be published in the Transactions.

6.—Report upon Silk Worm's Cocoons sent by Captain Jenkins, and forwarded by Messrs. Cantor and Co.

The Committee had submitted some of these through R. Watson, Esq., for trial, and the following extract from Mr. J. E. Warner's letter to Mr. Watson, dated Guttah, 5th November, 1837, will exhibit the result.

"I am sorry to say, that although three or four of my best cattanies tried to reel off the Assam cocoons, they were unable to succeed. It appears to me, that Captain Jenkins sent them in a cutcha state, as the chrysalis have eaten their way out of some of the cocoons, and in those they have remained, the cocoons not being properly dried, the fibres have rotted. When I failed in the filature reel, I tried to wind them off on the *lottah* (on which the gootee-mal is made) but with no better success."

Motions submitted to the meeting.

Proposed by the President, in reference to the increasing correspondence and labours generally of the Secretary, that a salary be awarded to Mr. Bell of 300 rupees per month.

The President read a letter to his address, dated 30th October, 1837, from Mr. W. Anderson, Wellesley Street, Calcutta, forwarding some printed copies of Scott's Compendium, and suggesting with reference thereto, the formation of a "Joint Stock Association for the promotion of Agriculture."

The following communications were read.

From Captain Bogle, of Arracan, (without date) received October 3d, speaking most favourably of the soil of Arracan, as well adapted for producing all the staples of India, and desiring a supply of seeds for experiment. Alludes to specimens of wood, sent up by the H. C. brig *Mermaid*, which have been received.

Note.—As nothing is said by Captain Bogle, as to whether these specimens were designed for this Society, being sent from the vessel without advice, the Secretary addressed a note to Mr. Seppings, who in reply, supposes they are intended for this Society, but there is no paper of reference.

From J. Little, Esq., Secretary to the Bombay Society, dated 20th September, advising the despatch per *Soobrow* of a box commissioned by Mr. Bell, containing 4 vine plants and four dozen cuttings of the same.

From Major J. A. Moore, of Hyderabad, dated 21st September, advising the despatch of six grafts of the *Nonpareil* apple tree, and from S. Jameson, Esq., Masulipatam, dated 23d October, intimating the shipment of these grafts per barque *Soobrow*.

From T. O. Crane, Esq., Secretary to the Agricultural Society at Singapore, dated 26th September, advising the despatch, per "*Emily Jane*," of 16 mangosteen plants, commissioned by Mr. Bell, which have been received and are submitted for the inspection of members. The plants have arrived in excellent preservation. Mr. Crane reports favourably of the sea-island and Bourbon cotton, and promises in due course to forward a report of experiments made in that island by Dr. Almeida and himself.

From Messrs. Cantor and Co., dated 20th October, forwarding a quantity of area silk and cocoons, just then received from Captain Jenkins, of Assam.

Memorandum.—The specimens have been submitted to the Silk Committee, and in accordance with a resolution, Mr. R. Watson has taken a small portion of the cocoons to see if they can be wound off.

From E. Bentall, Esq., of Dinagore, dated 16th October, presenting a piece of cloth, made of silk, spun by the worm which feeds on the castor oil plant.

From Dr. Wallich, as follows:

No. 1. Dated 14th October, enclosing two letters to his address from Captain Jenkins, the first under date September 25th, forwarding another specimen of Assam Caoutchouc; the second, dated September 26th, handing over severed rolls of specimens of the bark of the "*uggur-gach*," both in a prepared and unprepared state.

No. 2. Dated 14th October, enclosing a memorandum of plants and cuttings that can be supplied from the Society's Nursery.

Memo.—These have been advertized, and many applications have been met.

No. 3. Dated 14th October, forwarding specimens of thread and cloth, and a small quantity of seed, the produce of Nankin cotton shrubs, grown at Mr. Manly's garden at Keerpoy, from seed originally received from the Botanical Garden.

No. 4. Dated 16th October, forwarding for the purpose of being laid before the Society, a report by Mr. W. Griffith, on the Tea Plant of Assam.

No. 5. Dated 24th October, forwarding with reference to the above communication, 2 drawings and 3 maps, belonging to Mr. Griffith's report.

No. 6. Dated 2nd November, forwarding for presentation 3 specimens of Caoutchouc, prepared under the guidance of Assistant Surgeon Scott, of Gowhatti.

From Dr. A. Campbell, of Nepal, dated 3rd October, transmitting for comparison, four samples of maize, viz. two the produce of American seed of the Canadian and Bostonian species received from the Society, and two of the white and yellow maize of Nepal, and giving some information regarding them.

From the same, dated 6th October, regretting his inability to send the promised plants of the "Prangass," owing to the whole of the plantation having through inadvertence been destroyed. Forwarding in the name of Mr. Hodgson a small supply of red clover seed.

Stating that in his opinion the climate of Nepal is well suited for acclimating European seeds, before establishing them in Bengal.

From Dr. Hufnagle, dated 23rd October, giving cover to a note from Colonel L. R. Stacy, to the address of the Secretary, forwarding two packets containing several varieties of melon seeds.

From Lieut. H. Bigge, of Bissenath, Assam, dated 6th October, intimating the favourable progress of their branch Society, and soliciting a supply of seeds.

From His Excellency, Monsieur Bedier, Governor of Chandernagore, intimating his intention of shortly quitting that settlement for the Isle of Bourbon, and offering his services to this Society during his residence there. Expressing regret at not having been able to devote more time to the objects of an institution in the welfare of which he feels the deep-

est interest ; encloses a printed circular and regulations of an Agricultural Society which was established by him at Bourbon some time ago.

From Major Sleeman, dated Simlah, 17th October, enclosing copies of a correspondence between Lieutenant Charles Brown and himself, on the subject of a charge to be made to applicants for the Otaheite cane from his Jubbulpore plantation, and requesting that the same may be brought to the notice of the Society.

Memorandum.—The Secretary had anticipated the concurrence of the Society, and had written to Major Sleeman, stating that, in as far as the Society's demands upon the plantation were concerned, there could not be the slightest objection to the moderate charge of four pice per cane, the rate at which it had been already sold, to keep up the stock of one of the most useful establishments in India.

From G. U. Adam, Esq., dated 30th October, on the subject of two bags of Tinnevely cotton seeds received since, through the kindness of this gentleman, and of which a considerable portion has been already distributed to Captain Jenkins, Assam, to Mr. Blundell, Moulmein, and various parts of the interior of Bengal.

From E. A. Blundell, Esq., dated Moulmein, 19th October, acknowledging receipt of the Secretary's letter of the 19th September, and of the cotton seeds therein referred to.

From Dr. Campbell, of Nepal, dated 22nd October, promising to forward with reference to the Secretary's request, a sufficient quantity of the different Agricultural productions common to the valley, sufficient to sow 5 cottahs of each variety.

From W. Cracroft, Esq., dated 31st October, forwarding three samples of Caoutchouc. One in its original state produced at Penang, the other two prepared in England from South American produce.

From Lieutenant Hannington, dated Purulia, 12th October, acknowledging the Secretary's letter of the 18th September, offering to send an assortment of seeds ; suggests the translation of such circulars as offer premia, into the vernacular languages.

Note.—This has been already done through the suggestion of Mr. Walters, at least in Bengalee, and the Hindee translation is now in press.

From Capt. Harkness, Secretary to the Committee of Agriculture and Commerce of the Royal Asiatic Society of Great Britain and Ire-

land, dated 11th May, 1837, intimating in reply to Mr. Bell's circular letter of the 4th April, 1836, a mutual wish on the part of the Committee to correspond with the Society.

Stating that the Committee have forwarded to the Government of Bengal, specimens of the lichens used in Europe for dyeing, and requesting the assistance of the Society in transmitting specimens of the same description of article employed in India, or any other of the products of this country which may appear adapted to the same object, for the purpose of being submitted to experiment.

From Jas. Prinsep, Esq., Secretary to the Asiatic Society of Bengal, dated November 2nd, giving cover, for the information of this Society, to copy of a letter addressed to the Right Honourable Lord Auckland, by the Secretary of the Royal Asiatic Society of Great Britain, on the part of the Committee of Agriculture and Commerce, transmitting several specimens of lichens above alluded to, and stating that the specimens of this weed with chemical tests, have been deposited in the Asiatic Society's Museum, for the inspection of Members. Forwards for the use of this Society five copies of the 1st part of proceedings of the Committee, which contains some information regarding the lichen.

Memorandum.—The Secretary has opened a correspondence with the Committee, by transmitting samples of the products of the valley of Nepal, recently received from Dr. Campbell.

From Mr. Veterinary Surgeon H. C. Hulse, of Muttra, dated 28th September, suggesting the offer of a premium by the Society for the heaviest and fattest country sheep. Offering to forward the plan of an establishment for the breeding, &c. of *horses*.

Mr. J. C. Marshman presented, in the name of the Author, a copy of Review of the Doctrines of the Ricardo, or New School of Political Economy, by Major W. H. Sleeman.

Some copies of proceedings of the Committee of Agriculture and Commerce, have been received through Messrs. Thacker and Co.

From Dr. Wallich, dated November 7th, forwarding extract of a letter to his address, received from Dr. Wight, of Madras, bearing dates the 20th and 23d October, on the subject of his cotton experiments.

Dr. Huffleagle presented specimens of the second crop of *Upland Georgia Cotton Seed*, and some pods from *acclimated seeds*. The cotton was considered of very superior quality.

Mr. Ewart submitted a mem. on experiments made by him at Leeds on a cask of American Upland Georgia cotton seed, weighing 1 cwt. 1 qr. 14 lbs. net, which produced

	cwt.	qrs.	lbs.
Of Oil.....	0	1	4
Cake.....	0	3	20
	1	0	24
			18 loss.
Cwt. 1	1	14	

1. The production of oil is not more than half of what the same quantity of rape seed would have produced.

2. The loss is considerable, owing, it is supposed, in part to the seed being in an unusually soft state.

3. This seed would not yield its oil at all without warming, or so little as to be of no practical use.

4. The heat applied was about the same as is used in crushing rape seed.

5. The seed yields its oil more tardily than rape.

6. The oil is more glutinous than rape oil.

7. It is more difficult to combine it with soap.

8. For these reasons it is thought not to be applicable to the uses of the mechanic or manufactures. It is thought it could not be refined.

In the event of its proving a drying oil, its colour would prevent its being used except for the most common purposes.

The cake has a different appearance from rape cake, but cannot say how far it would be equally valuable as a food, or a manure.

Some specimens of Maize were presented by W. Storm, Esq., the produce of Kishnaghur, grown by A. Macarthur, Esq., of Bamundee Factory, of Canadian seed sent from this Society.

Two plants of the Fungus Tribe were presented by D. McFarlan, Esq., some time ago, and omitted to be recorded before. They are more generally known by the name of Neptune's Cup.

Mr. Bell will be happy to supply any member who takes an interest in the propagation of fruit trees with a plant of the Mangosteen, of which he has received several as a present from Mr. Crane, of Singapore.

A notice was put in by Mr. Bell, as a competitor for the silver medal and premium for a cultivation of ten beegahs of guinea grass, which question was left to the decision of the Society, on a report from a Committee consisting of Dr. Jackson, Captain Leach and W. F. Gibbon, Esq., who agreed to meet and visit the cultivation.

Mr. Bell is also a competitor for the highest premium, on the production of one maund of guinea grass seed.

The quantity sent in to the Society by Mr. Bell, already amounts to one maund and twenty-one seers of well dried seed sifted from all stalks and impurities, which he presented to the Society, whether a successful competitor or not, and this quantity is sufficient to introduce this superior grass throughout all India, if the simple rules laid down by Mr. Bell for sowing and planting be observed.

Applicants are invited therefore to lose no time in sending for what quantity they require.

The thanks of the meeting were ordered to be offered for all these communications and presentations.

*Agricultural Society's Office, }
Town Hall, Nov. 8, 1837. }*

Nursery Committee's Proceedings.

(Read and adopted 8th November, 1837.)

A Meeting of this Committee took place at the Botanical Garden on Friday evening, 20th October, 1837, at 5 o'clock.

Present.—Dr. Wallich, Mr. Storm, Mr. Bell.

The Committee proceeded to visit the Nursery.

The Otaheite sugar-cane is doing well, and with reference to its having been planted out of season, and at different periods as received, is throwing out vigorous and numerous suckers. These the Committee would have ordered to be cut out had the quality and size of cane been a desideratum, but as the object of the Society is to have abundant plant for distribution, the Committee have deemed it expedient to cut down some of the largest cane in order to extend the cultivation, and these cuttings have been planted out in square holes, after the West India method.

The original beds are still susceptible of pruning and the Committee have resolved, to extend the cane piece as far as there is space on the

same plot without encroaching on the Upland Georgia and New Orleans cotton beds, when, if there still remains a surplus, the Committee have resolved to appropriate two plots now ready dug adjacent to the tank for the greater facility of irrigation. Before going further, your Committee are happy in being able to record the favourable opinion of a gentleman, whose practical experience in the West Indies, and observations in the Mauritius, is the best guarantee for the accuracy of his judgment.

Mr. Guilding, who has been an active practical planter in the West Indies upwards of 20 years, has visited the Society's Nursery, and pronounces the Otaheite sugar-cane, to be looking very healthy, and with reference to the disadvantages under which the canes (not plants) were received, that the produce is very satisfactory. Mr. Guilding is, at present, absent on a tour of observation, but your Committee doubt not, he will, on his return to Calcutta, corroborate in writing, what he has expressed verbally.

Next to the Otaheite cane stand in importance the canes received from Dr. Montgomerie, of Singapore.

It is hardly possible to form any opinion of the comparative size and quality of this cane, with that of Otaheite, until they attain maturity, but your Committee have seen sufficient to convince them, that they are superior to the desee. The plants received some months ago, having grown up most luxuriantly, the Committee have resolved to extend the cuttings as soon as the largest canes are fit to cut into plants, leaving a few in their original condition to see the effect upon the size of the cane by thinning. The character of this cane is, in its present stage, difficult to determine. It appears to your Committee to be a link between the China and Otaheitan species, partaking of the former as regards the number and closeness of shoots, and of the latter in the graceful bend of the leaf in the centre of which is a broad white ribbon which gives it, in Mr. Guilding's opinion, much the appearance of "Guinea cane."

The last importation of this cane is still in the hopper and the cuttings have sent forth numerous roots, but no appearance of the eyes germinating is yet perceptible.

The China cane is exceedingly luxuriant, and the numerous shoots from plant, admit of its being well thinned in order to extend the cultivation for distribution to those who wish to try it in contrast with other kinds.

Before taking leave of this subject, the Committee beg leave to record

their obligations to Dr. Montgomerie, of Singapore, for the prompt measures he has adopted in meeting the wishes of the Society as expressed to that gentleman by the Secretary, and it must be gratifying to Dr. Montgomerie to be assured, that his attentions are duly appreciated.

Cotton.—In conformity with a Resolution of the Committee passed at the last meeting in the Nursery, the New Orleans and Upland Georgia Cotton Plants in Plot No. 1, had been cut down, and it is now resolved not to disturb the roots, unless the premiums offered for sugar-cane, should put the Society in possession of large supplies, and circumstances render it necessary to devote all the land dug up, to the reception of canes. The roots are left with a view to ascertain the proportion of seed which the shoots will produce.

Resolved, that the Egyptian Cotton, which is still flowering and fruiting, be allowed for the present to remain, and with reference to what Mr. McCullogh, the English Gardener to the Pashaw of Egypt has stated to the Committee this evening, as to the method observed in Egypt, that every alternate plant be cut down so soon as the present crop of seed is gleaned.

The Tinnevely Cotton, from seed received from Dr. Wight, has sprung up but sparingly; the beds were ordered to be well weeded, and the soil loosened about the roots of the plants.

Since the last Committee Meeting it has been deemed expedient to advertize* several kinds of plants and cuttings for distribution, and they are happy to observe, that several applications have been already made, and complied with.

Mr. Bell, reported that in consequence of many Members having neglected to send for their quotas of vegetable seeds in due course, and the number of mallies who were supplied being greater this year, he had felt himself called upon to purchase a small consignment per *Perfect*, from Messrs. Boyd and Co., amounting to 260 rupees. These seeds were shipped by and on account of Messrs. Tredgold of the Cape.

The Committee approve of the steps taken by the Secretary, as necessary to prevent disappointment, but recommend, that in order to guard against the like contingency in future, the Secretary be directed to fix by advertisement a period of *six weeks* from the arrival of seeds being publicly announced, within which, if not applied for by members, the surplus shall be sold.

The Secretary informed the Committee, that he had sent his annual

indent on Mr. Villet, at the Cape, for supplies of vegetable and flower seeds, and with reference to the increasing number of members he had ordered a greater quantity and variety.

The Committee, before closing their report upon the Nursery, think proper to observe, that from the date on which Mr. Griffith's first letter was received by the Secretary until the special Committee's Report was read, and confirmed by the last General Meeting of this Society, not a blade or weed was touched or removed with their sanction or knowledge, or by their orders, either individually or collectively; on the contrary, the Committee continued their visits to the garden, but on each occasion, strict orders were given not to touch any thing in the Nursery, though several suggestions were made, as usual, for its improvement, when they should feel themselves at liberty to carry them into effect.

Your Committee are desirous, since the charge brought forward by Mr. Griffith, has now been set at rest, that the number of members, both on the Nursery Committee and Committee of Papers, be increased, and your Committee, being anxious that the utmost publicity be given to their proceedings, have resolved, that their Reports be published monthly in the Journals of the Presidency along with the Secretary's report, if it be not too long, and the Editors will kindly afford space.

N. WALLICH.

W. STORM.

JOHN BELL.

Committee of Papers.

(Read and adopted 8th November, 1837.)

A Meeting of the Committee of Papers took place at the residence of Dr. Wallich, Botanic Garden, on Friday evening, 20th October, 1837.

Present.

N. Wallich, Esq. M. D.

W. Storm, Esq.

John Bell, Esq.

Dr. Jackson's Motion.

Proposed by Dr. Jackson, seconded by Mr. Bell, "That, in order to afford the fullest means of information to the Members of the different Committees on the subject of their various researches and mat-

"ters of enquiry, each Committee be furnished with the best standard works in their particular departments, and that the Members of each Committee be invited to prepare a list of such works, as they may think it advisable to have access to for consultation on occasions of reference, and to submit such list for the consideration of the Society at the next Meeting."

The annexed motion having been ordered for consideration by the Committee of papers.

Resolved, That measures be taken to provide such books as are calculated to assist the different Committees in their enquiries, and that the following be immediately purchased :

• Reports &c. connected with the proceedings of the E. I. Company in regard to the culture and manufacture of Cotton, Raw Silk and Indigo.

Parts of the Library of Useful Knowledge.

viz.

1. Breeds, and management and diseases of cattle.

2. British Husbandry.

McCulloch's Dictionary.

Resolved, That Government be solicited to furnish a copy of "*Minutes of Evidence taken before the select Committee of the House of Commons on the affairs of the E. I. Company*", which the Committee believe contains a vast deal of important information connected with the objects of the Society.

The Secretary informed the Committee, that in reference to the resolution passed at a General Meeting on the 8th February last, the following works had been purchased for the Society's Library, viz.

McCulloch's Statistical account of the British Empire, 2 vols.

London Encyclopædia of Agriculture, 2 vols.

Domestic Gardener's manual, 1 vol.

The Green House Companion, 1 vol.

Phillip's Guide to Geology, 4 vols.

Lyall's Principles of Geology, 1 vol.

Deluc's Letters on Geology, 1 vol.

Mawe's and Abercrombie's Universal Gardener and Botanist. 1 vol.

With reference to a question agitated recently, the Secretary wished to know at what rate he is to charge members for the back volumes of the Society's Transactions, and if any difference is to be made between members and others.

Resolved, That members shall be entitled to the volumes retrospectively for a sum not exceeding the cost charges ; and to other than members the price already fixed ; but Members applying are required to state that the volumes. are for their own bonafide use.

N. WALLICH.

W. STORM.

JOHN BELL.

Agricultural and Horticultural Society of India.

A general Meeting of this Society was held at the Town Hall, on Wednesday morning, the 13th December, 1837, at half-past 9 o'clock.

Present.

The Hon'ble Sir E. Ryan, President, in the chair ; Hon'ble Colonel Rehling ; Colonel D. McLeod ; Dr. Wallich ; Dr. Huffnagle ; W. Cra-croft, and J. S. Stopford, Esqrs. ; Baboo Cossinath Bose, F. T. Fergusson, Esq. ; R. Walker, Esq. ; A. Beattie, Esq. ; D. Hare, Esq. ; Captain H. Drummond ; John Jenkins, Esq. ; M. S. Staunton, Esq. ; G. A. Prinsep, Esq. ; Dr. A. R. Jackson ; A. Grant, Esq. ; G. F. McClintock, Esq. ; T. S. Kelsall, Esq. ; C. DeVerinne, Esq. ; W. K. Ewart, Esq. ; W. Storm, Esq. ; D. F. McLeod, Esq. ; G. T. F. Speed, Esq. ; W. Earle, Esq. ; R. Smith, Esq. ; C. H. Blake, Esq. ; M. A. Bignell, Esq. ; W. D. Shaw, Esq., and John Bell, Esq.

Visitors.

Messrs. Rice, Sandys and Wood.

The proceedings of last meeting were read and confirmed.

The following gentlemen proposed at last meeting were elected members of the Society.

Meer Abbass Ali Khan ; C. G. Millman, Esq. ; E. A. Blundell, Esq. ; Mirza Mahomed Mehde Meski ; J. S. Torrens, Esq. ; C. S. ; C. Garstin, Esq. ; C. S. ; Captain W. M. Stewart ; Captain H. Drummond ; W. G. Maxwell, M. D. ; and Lieut. W. C. Sibley.

The following gentlemen were proposed, viz.

The Rev. F. Wybrow, proposed by C. H. Blake, Esq., and seconded by the Secretary.

Konwar Krist-Nath Roy Bahadoor, Rajah of Cossimbazar, proposed by Sir E. Ryan, and seconded by the Secretary.

C. Tucker, Esq.; C. S., proposed by H. Walters, Esq., and seconded by the Secretary.

Thomas Palmer, Esq., proposed by D. W. H. Speed, Esq., and seconded by W. Storm, Esq.

H. C. Kemp, Esq., proposed by the Secretary, and seconded by W. Storm, Esq.

Dr. A. Campbell, Assistant Resident at Nepal, proposed by the Secretary, and seconded by Dr. Wallich.

E. W. Claributt, Esq., Assistant Surgeon, Akyab, proposed by the Secretary, and seconded by H. Walters, Esq.

Lieutenants J. R. Lumsden, and J. R. Abbott, Arracan, proposed by the Secretary, and seconded by H. Walters, Esq.

Captain F. Smallpage, 8th Regt. Light Cavalry, proposed by A. Beattie, Esq., and seconded by Dr. Wallich.

MOTIONS.—The President brought forward the motion made at the last general meeting, prefacing it by some remarks on the present condition of the Society, viz.

Proposed by the President, seconded by Dr. Jackson and resolved: That in reference to the increasing correspondence and labours generally of the Secretary, a salary be awarded to Mr. Bell of 300 rupees per month. Carried, *nem. con.*

MOTIONS SUBMITTED TO THE MEETING.—1st. “Moved by Mr. W. Storm, seconded by Mr. Bell, that an application be made to the Admiral Commanding in India, requesting him to give instructions to any of Her Majesty’s Ships of war touching at Otaheite, to bring such quantity of the sugar-cane of that island, as they may be able conveniently to carry for the use of this Society.”

2d.—“Moved by Mr. Cracroft, seconded by Dr. Wallich, that from the report of the Caoutchouc Committee, (*vide notice hereafter*) and examination of the specimens, it appears to the Society that Lieutenant Vetch’s exertions, and experiments have been eminently successful; he has produced and laid before the Society a larger quantity of the gum of a quality superior to any yet brought to their notice. Circumstances prevent his placing at the disposal of the Society a portion of the present despatch of the weight specified in the Society’s advertisement; (though the despatch is nearly three times that quantity) nevertheless the Society, anxious to mark their sense of his exertions, it is proposed to award a gold medal on his forwarding on an early date the quantity

specified in the advertisement (one maund) not inferior in quality to that brought to their notice by Dr. Wallich."

3rd.—"Moved by Mr. Bell, seconded by Mr. Storm, that a machine, &c." (for the entire of this motion, see after Mr. T. Sandy's communication on a new method of raising water in the subsequent part of this report.)

REPORTS.—Read the Committee's Report on samples and prices of cotton sent to the Honourable the Court of Directors, signed by Messrs. Storm, Adam, Willis, Colvin, Syers, Huffnagle and Bell.

Read also Mr. Earl's note concurring in the report throughout, but declining to sign in consequence of "not having attended to the matter lately, nor read, at least recently, the Court's letter."

Read also Mr. G. A. Prinsep's minute appended to the report.

Proposed by the President and resolved, that the Report of the Committee be printed together with Mr. Prinsep's note in the Society's Transactions.

Read the Caoutchouc Committee's report on specimens produced by Assistant Surgeon Scott, of Assam, on samples presented by Mr. Cracroft, the produce of Penang and South America.

The President proposed, and was seconded by the Meeting, that a part of each of Surgeon Scott's samples be sent to the Society of Arts, and to the Agricultural Committee of the Royal Asiatic Society of Great Britain and Ireland.

Resolved further, that the report be adopted and published in the Society's Transactions.

Read the Minutes of the Caoutchouc Committee in a letter from Dr. Wallich to the Secretary, dated the 4th December, accompanied by samples of gum taken from a chest, in transit to Europe, prepared by Lieut. Vetch, of Assam, soliciting attention to these specimens, and suggesting that Lieut. Vetch be awarded the Gold Medal, for his exertions with reference to the quantity then in Dr. Wallich's hands, which far exceeded the quantity required by advertisement, although he (Dr. W.) was not authorized to retain any portion of this Caoutchouc agreeably to the conditions of the resolution, that had been previously passed in regard to encouraging the collection of good Caoutchouc.

Upon these minutes, Mr. Cracroft based his motion already noticed under the proper head.

Read the Nursery Committee's Report, which was accompanied by a very neat, and well executed plan of the ground as now laid out.

Resolved,—that the Report be adopted, and that the best thanks of the Society be offered to Dr. Hufnagle, for the trouble he has taken in surveying the Nursery.

Read the Report of a Special Committee, appointed to report on Mr. Bell's guinea grass cultivation, accompanied by a plan of the ground which, by actual measurement, occupied in guinea grass 10 beegahs, 7 cottahs, 13 chittaks, $5\frac{1}{4}$ feet.

Resolved,—That Mr. Bell is entitled to the 2d class premium and Silver Medal, for cultivation.

And to the 1st class premium for seed from such cultivation, provided no other competitors appear before the 1st January, 1838.

Read the Sugar Committee's Report, on the suggestion of Mr. Payter, of Bogorah, to hire a vessel to bring a cargo of Otaheite cane from the Island direct.

Resolved,—That the Committee's Report, which is unfavourable to the scheme, be confirmed.

Read Proceedings of the Silk Committee on the subject of a further supply of the area cocoons, forwarded by Capt. Jenkins, through Messrs. Cantor and Co. A portion of each sample has been sent by Mr. R. Watson to Guttal for another experiment, as to the possibility of winding off the silk.

Mr. Blake, of Dhoba, who was present, presented samples of five quantities of sugar, some treacle and rum, of which he has promised to favour the Society with particulars, as to opinions in England and prices hereafter.

Mr. Charles Deverinne presented in person samples of Upland Georgia, Sea Island, and New Orleans cotton, grown at Kaleepool and Jessore, from American seed, supplied by this Society; and promised to give particulars as to returns, cost of production, &c. when the whole crop is taken off.

Dr. Hufnagle presented specimens of Upland Georgia cotton in the pod, grown in his garden at Cossipore from acclimated seed. Dr. H. also noticed the result of an attempt to obtain *Potash*, from "soondry" wood ashes. The residuum furnished less than 4 per cent. of the alkali, and the quantity of muriate of soda amounted to about 70 per cent.

Dr. H. states that there is a possibility, however, that the wood used in experiment had been saturated with salt water.

Some samples of Cotton twist and cloth, made from the Pernambuco cotton, forwarded by Mr. Blundell, were sent in by J. S. Crawford, Esq. but are now before the Committee.

From W. Griffith, Esq., dated Cherra, November 1st, acknowledging the receipt of the Secretary's letter of the 3d of October, and of the copy of the proceedings of the Committee of Enquiry that accompanied it.

From J. M. Sinclair, Esq., of Lucknow, offering on the part of Mr. Fortier, of the same place, a supply of Otaheite sugar-cane, at 10 rupees per 100, but stating that they were of inferior quality. Mr. Fortier's note had been circulated to the Agricultural Committee, who decided that it would not be advisable to accept the offer, with reference to the stated inferiority, and the risk attending transmission, the last supply from Lucknow having been received in very bad condition.

From C. Burnett, Esq., Adjutant, Mhairwarrah Local Battalion, dated October 27th, promising to forward, by the hand of Dr. Maclean, samples of cotton produced from seed, sent by the Society to Captain Dixon, as also samples from seeds of the first year's produce.

From R. Davidson, Esq., of Calcutta, dated 8th December, enclosing extract of a letter from a friend, dated Beaur or Mhairwarrah, 18th November. "I have the pleasure of enclosing a small sample of uncarded cotton (grown in our garden) from American seed, which is pronounced to be of a fine quality."

Memo.—The sample is referred to the Cotton Committee for opinion.

From Dr. Hufnagle, dated November 11th, presenting to the Society a maund of Indian corn, the produce of his garden from American seed.

From Mr. T. Black, enclosing an estimate of the cost of lithographing the maps and drawings belonging to Mr. Griffith's report, on the Tea plant of Assam.

From Major Moore, dated Hydrabad Residency, October 30th, enclosing a letter to his address from Mr. S. Jamieson, dated Masulipatam, October 24th, forwarding a memo. of the cost of shipping, &c. per barque *Soobrow*, the graft apple plants consigned to his care on account of the Agricultural Society and Mr. Storm.

From Mr. S. Jamieson, to the Secretary, dated Masulipatam, October 31st, enclosing a note from Major Moore, dated 14th September, regard-

ing the transmission of the above grafts, and advising the despatch of them from that Port, per barque *Soobrow*.

From Dr. Wallich, dated 9th December, enclosing the following report of Mr. Masters, on the condition of Major Moore's grafts, received by the Secretary from the *Soobrow* on the 7th, and forwarded to the Botanical Garden:

"*Botanical Garden, December 8, 1837.*—Received three boxes containing six plants of a species of apple in six flower pots, nearly all dead; two of the grafts are alive, but they are on very unhealthy stocks, the other four grafts are entirely dead; all of them have been injured by the bandage, which appears to have been made of oil cloth, which did not give way by the swelling of the grafts."

(Signed) J. W. MASTERS.

A letter was read at the last General Meeting from J. Little, Esq., Secretary to the Bombay Agricultural Society, dated 20th September, enclosing a receipt, for a box, despatched by the same unfortunate barque *Soobrow*, containing four vine plants, and four dozen cuttings of the same. The receipt was sent on board, and a verbal message returned, that no such box was on board.

The Secretary called upon Captain Smith to explain, and Captain Smith, intimated to the Secretary, that in consequence of the very disastrous passage, all the plants died, notwithstanding the attention paid to them by passengers on board, and that the box was thrown overboard.

From H. C. Tucker, Esq., of Azimghur, dated 18th November, acknowledging the receipt of seeds, forwarded to his address by the Steamer.

From R. Montgomery, Esq., of Azimghur, dated 18th November, acknowledging receipt of seeds, &c. and requesting to be informed if the Society has received his replies to the queries conveyed in the circular, received by him some time ago, together with a map of the district.

N. B.—For the communication alluded to, see notice further on.

From Dr. G. N. Cheek, Secretary to the Burdwan Society, dated November 22d, acknowledging the receipt of an assortment of seeds for the use of that Society.

From J. W. Laidlay, Esq., Secretary to the Agricultural Society of Moorsshedabad, dated November 24th, returning thanks, on the part of that Society, for a supply just then received. Reports favourably on the

condition of their experimental garden, and on the flourishing state of the Society in general.

From H. Piddington Esq., dated 22d November, enclosing a paper, giving an account of the manner in which good butter can be made, and adds a description of the churn employed.

From the same, (no date) received 4th December, forwarding a paper containing "additional remarks on the prevention of contagious diseases amongst cattle."

From Mr. J. Avdall, dated Cossipore, November 29th, forwarding for presentation to the Society, a *yam* of an unusual size, the produce of a garden at Cossipore.

From Dr. Campbell, of Nepal, dated November 20th, advising the despatch of two samples of the brown corn of Australia, grown at Cathmandoo and Sugowly, in Zillah Sarun, from acclimated seed, received from the Secretary in May last, and giving some information respecting the experiments made with it. Forwarding at the same time some of the white janera of the plains, grown at Cathmandoo, for comparison with the other two samples.

Suggests the establishment of a Nursery at Cathmandoo, on a small scale, to nurture plants for furnishing seed to the plains, and offers his services to the Society in superintending the operations.

From Capt. Jenkins on the river, dated 27th November, acknowledging the receipt of the Secretary's letter on the subject of Caoutchouc, under date the 5th November, and which advises the despatch of a wooden form, &c.

Enters into some particulars with respect to the Committee's proceedings, regarding the reeling, &c. of the area cocoons transmitted to him.

From Dr. Wallich, dated 28th November, annexing extract of a letter from Dr. Wight, of Madras, dated the 13th ultimo.

"My object in now writing to you, is to send you a specimen of my lithograph of the dye lichens for presentation to the Agricultural and Horticultural Society, and to say, that if it should be esteemed a desirable addition to their next volume of Transactions, I think I can supply 500 copies for that purpose; now pray lose no time in letting me know the result, as I am as yet but indifferently supplied with lithographic stones, and it is no small loss to be deprived of the use of such an one, as that from which the impressions have been taken, &c."

The Secretary, with reference to Dr. Wight's desire to have a speedy

reply, had ventured to anticipate the concurrence of the Committee of Papers and of the Society, to have so desirable an acquisition, as that which Dr. Wight had offered, and had expressed his conviction to this effect to Dr. Wallich.

Since then, he had circulated the drawings and extract, which had obtained the consent of the Committee, with a desire to express their obligations to Dr. Wight for his polite offer.

Proposed by the President, seconded by the meeting, that the best thanks of the Society be offered to Dr. Wight, for his liberal donations.

From Thomas Waghorn, Esq., dated Cairo, 22d October, 1837, advising despatch per Steamer *Atalanta*. to Mr. Secretary Little, of the Bombay Agricultural Society, for transmission to this Presidency, of a chest containing a quantity of the best Maho cotton seed in Egypt, which he begs may be presented to this Society in his name.

From Dr. Campbell, of Nepal, dated 28th November, in reply to the Secretary's letter of 20th November, asking for a small supply of each size and quality of paper manufactured at Nepal for experimental purposes; intimates his intention of transmitting a quantity, and suggests that samples of each variety be forwarded to the Chamber of Commerce.

Encloses copies of a correspondence that has lately passed between Mr. T. C. Scott and himself on the subject of this paper, as likely to prove interesting to the Society.

From Captain Sanders, Secretary to the Military Board, dated December 6th, annexing copy of a letter to his address from Major Gwatkin, Superintendent of the Haupper Stud, under date November 23d, requesting information regarding the cultivation, &c. of Guinea Grass, and desiring a supply of seed from the Society's stock.

From D. B. Syers, Esq., dated 25th November, offering to furnish to the Society, at the original costs and charges, a quantity of fresh New Orleans cotton seed, imported per *Otterspool*.

From R. Montgomery, Esq., of Azimghur, dated 14th September, transmitting a copy of Regulations framed for the guidance of the Branch Agricultural and Horticultural Society, recently established at that station. Requesting assistance from the parent Society in supplying seeds.

From the same, dated 27th September, forwarding a map of the district, together with replies to the Agricultural queries circulated by this Society, drawn up conjointly by H. C. Tucker and R. Montgomery, Esqrs., also giving much valuable information on other subjects connected with the district in question.

Memo.—These interesting communications ought to have been submitted in *October*, but from their outward appearance, they were mistaken for official returns of grain, and left at the General Post Office with all these documents, pending a reference to Government on the subject of postage. They were then immediately transferred to the Secretary of the Statistical Committee, and only recovered on the 11th instant, on application to that gentleman by the Secretary of this Society, under a supposition that they might be among these documents.

From H Piddington, Esq., dated December 10th, presenting to the Society, a few heads of rice from Carolina seed.

The following presentations were made in addition to those already enumerated, with their respective communications.

A plan of the Agricultural Society's Nursery as at present laid out, drawn and presented by Dr. Hufnagle.

Sixteen specimens of Lichens, from James Prinsep, Esq., Secretary of the Asiatic Society.

Samples of tobacco, from Persian seed, and of Upland Georgia and New Orleans cotton, grown in the Branch Society's garden at Burdwan, but not alluded to in Dr. Cheek's letter already noted.

Two quarts of Sandoway tobacco seed, presented by Capt. Bogle, of Arracan.

Library of Useful Knowledge, one volume. "Cattle, their diseases, breeds and management," by A. R. Jackson, Esq., M. D.

Presented by the Secretary, "Bell's Comparative View of External Commerce of Bengal."

Twenty-two seers of Guinea grass seed, a root of the ole, from stock brought from the Persian Gulf.

From H. Walters, Esq., dated 12th December, presenting, on the part of Mr. P. Wise, two specimens of tea, grown in the Tipperah Hills, and prepared by the natives for common use. One sample is the leaf in its dried state, the other undergoing maceration with salt in a bamboo, preparatory to use. A few leaves accompany this communication dried in their natural form. Mr. Walters says, "the tea plant found wild in the Tipperah Hills may not be the same as that cultivated in China; but as it is evidently a plant of the same family as will be apparent from inspection of the dry leaves enclosed, there can, I imagine, be little difficulty in introducing the *true* plant in the same locality."

From John Francis Sandys, Esq., dated Garden Reach, 12th December, forwarding models of 2 machines, (invented by Teignmouth San-

dys, Esq., C. S. Arrah) for drawing water, either from a reservoir or well.

The Bi-Lever Balance Crane ;

OF

“ Jack and Jill.”

“ The principle of the machine is of the simplest kind It is, in short, the application of the common endless chain, operated on by two levers, balancing evenly, and alternating on this principle, work a counterpoise attached to one of the said two levers ; which, though not the chief, yet forms its secondary force. The chief, or the moving power, is the weight of men, or of larger animals, walking in and out of both the levers ; thereby creating the actions of ascent and descent.

These models are so accurately constructed and described by Mr. Sandys, that they will amply repay a visit to the Town Hall to inspect them, and as one of them is a working model, the principle will be understood at a glance.

The machine invented by T. Sandys Esq., combines simplicity and cheapness ; but its greatest commendation is the vast saving of labour.

Proposed by the Secretary, seconded by W. Storm, Esq., that a machine be constructed after Mr. Teignmouth Sandys' model, No. 2, at the tank adjoining the Sugar-cane cultivation on the Society's Nursery, in order that its utility may be fairly tested, and that a minute account of expense of construction and working be kept, as a guide for those who may be desposed to adopt the Bi-Lever-Crane. Further, that the Nursery Committee and Committee on Implements of Husbandry and Machinery, be requested to co-operate in superintending its erection and application, and to report upon it.

Proposed by the President and Resolved, that an estimate of the expense of erecting this machine be furnished by the Committee of Implements before the next Meeting.

The thanks of the Meeting were ordered to be offered for all these communications and presentations.

Nursery Committee.

(Read and adopted 13th December, 1837.)

A Meeting of this Committee assembled at the Botanical Garden, on Saturday evening, the 18th November, 1837, at 5 P. M.

Present.

N. Wallich, Esq. M. D.

W. Storm, Esq.

Capt. Leach.

W. F. Gibbon, Esq.

Dr. Hufnagle.

John Bell, Esq.

Proceeded to visit the Nursery; found that with reference to a resolution passed at the last Committee Meeting, the Otaheite canes had had been cut and planted out after the West India plan, in holes twelve inches deep, and a considerable accession made to the general cultivation, by adding plants from the original stock of Mauritius cane in the Botanical Garden.

The China cane has been also extended by the same process as adopted above. There are now upwards of 15 beegahs of Sugar-cane cultivation, and it is expected that there are yet available canes to plant out 5 or 6 beegahs more, for which land is already prepared.

Dr. Wallich informed the Members, that advices had been received of a supply of cane having been shipped from Bourbon, and it was resolved that ground sufficient be prepared against its arrival, and receive the same portion of lime by which the old Sugar-cane lands have evidently benefitted so much.

The Sugar-caness planted out, are coming up remarkably well, and hardly one has failed; a fact which is worthy of notice, as an opinion is prevalent in India, that cane cuttings, unless subjected to the process of being first planted in a hopper, will not answer, a circumstance which is of importance to keep in mind, as the mode of *forcing* the vegetation in the hopper is detrimental to the proper and gradual developement of the cane.

The Singapore canes first sent here by Dr. Montgomerie are most luxuriant, and if any fault exists, it is in its too great luxuriance.

The Committee resolve, with a view to experiment, that one half of these first plants be thinned, and the canes withdrawn, be cut up, and re-

planted to extend the cultivation; we shall thus see whether the plant in its natural state, will give a better cane, than when it has had the advantage of a free circulation of air and room to expand.

The new plantation of canes has been laid down perfectly in unison with the plan of holing in the West Indies, and reflects great credit on Mr. Masters, who has superintended the nursery operations.

Dr. Wallich proposed, and was seconded by Mr. Storm that the thanks of the Committee be offered to Mr. Masters for the great care he has bestowed, in laying out the canes according to the West India plan of holing.

The West India ginger looking very well, and it has been resolved to extend the beds as soon as the roots are fit for the purpose, and that no roots shall be distributed, until it shall appear to the Committee commendable.

Dr. Wallich informed the Committee that he had given Mr. McCulloch, the gardener to the Pasha of Egypt, a few roots of the ginger, as he had expressed a great desire to take a plant or two, and has promised to send the Society a collection of Agricultural seeds from Egypt.

Guinea Grass.

With a view to keep up a constant supply of this superior grass, it has been resolved to set apart a plot of ground, not exceeding one beegah, for this special purpose; the Secretary to supply roots from his garden.

The Sorghum-vulgare, of which seed was received from Madras for Captain Jenkins, and a little retained here, has vegetated freely.

The Cotton is looking well; the young plants from seed supplied by Dr. Wight, of Madras, are progressing; having had a good loosening about the roots, within the last month.

Resolved,—That the Egyptian Cotton plants be allowed to remain, as they are yet yielding seed, to be cut down immediately before the setting in of the rains.

Resolved,—That henceforward the Nursery Committee shall meet and visit the Nursery, on the Thursday preceding each monthly General Meeting, and on the 1st Wednesday following each monthly Meeting, unless some special occasion interferes to prevent regularity.

T. LEACH.

W. STORM.

C. HUFFNAGLE.

N. WALLICH, M. D.

W. F. GIBBON.

JOHN BELL.

NOTE.—The Committee have the pleasure to annex Dr. Hufnagle's plan of the Nursery, presented to the Society by that gentleman.

Suggestions on the propriety of modifying the general features of the Society's Transactions, from the commencement of the year 1837.

To N. Wallich, M. D.

W. Cracroft,

W. Storm,

M. A. Bignell,

W. Kerr Ewart, Esqrs.

Members of the Committee of Papers.

GENTLEMEN,

We are now rapidly approaching the commencement of another year, and with it, I trust, a continuance of that warm interest, in the proceedings of the Agricultural and Horticultural Society, which has contributed so essentially to its rapid rise, within a very short period.

My object in addressing you, is to solicit your attention to a few points which demand your consideration, in reference to the present condition and station of this Society.

We are now closing the publication of the 5th volume of the Transactions, and, therefore, in as much as the few papers which I shall have the honour to submit to complete this volume, are concerned, I do not wish to trouble you.

It will be seen from a glance at the title pages of the volumes already published, that an interval of nine years occurred between the publication of the 1st and 2nd volumes, during which the Society may be said to have remained in a torpid state, in regard, at least, to giving publicity to its proceedings; and this want of animation was accompanied by a serious falling off in the number of its members, and those who would have contributed the result of experiments and experience became disheartened in finding them not publicly and fully recorded for the information of others.

Under the fostering and zealous care and indefatigable labour of Dr. Wallich, as Secretary, and the interest taken in its proceedings by the president, Sir E. Ryan, a revival of all that was to be hoped for from an association such as this, took place, and from a wreck or nearly so, the Agricultural Society of India is at this moment, the largest in point of numerical strength, and I may add, the most important, as concerns the

commercial prosperity of the country, and destined, I trust, to become an effective instrument towards ameliorating the condition of millions.

It follows that, in the course of two years, we have published three volumes and a half, (for some part of the 2nd volume was printed in 1830,) and if the volumes are not so full of scientific researches, and regularly drawn up papers, the object of rapid publication has, at least, been attained, if we may judge from the proportionately rapid augmentation of Members, and the degree of eagerness shown by practical Agriculturists, to consign the results of their enquiries, whether of failure or of success, to a source where they make certain of their being recorded for the information and guidance of others, who may thus avoid falling into similar errors, or take advantage of what has been proved a successful method.

To this mode of publication, I attribute a large amount of the success which has brought the Society into so flourishing a condition; and if there are papers introduced which, in a firmly constituted Society, might be considered irregular, or not of sufficient importance, we must bear in mind, the *object* of not being quite so particular; and this without regret, since, I think, all will concur with me, that the speedy publication of what came before the Society was only due to those who have, by such means, assisted in an eminent degree to raise this Society, from a state of absolute bankruptcy to an engine of great utility.

Now that this object has been successfully attained, there can be no longer a necessity for giving publicity in the original unpruned form, to papers which may be destined to form the bulk of the Society's Transactions, and I would beg leave to suggest to the Committee, the propriety of authorizing me (or any Member who will take the trouble) to dispense with the numerous superscriptions and conclusions which attach to most of the communications already published, and in lieu thereof, that the contributors' names, designation, date of paper, &c. be embodied with the date of reading and the *heading*. This would save a great deal of space now absorbed in unmeaning beginnings and endings of letters, which, however gratifying in private correspondence, is out of place in the transactions of public bodies.

I do not mean to suggest any alteration in phraseology, but there are many communications that contain some exceedingly interesting particulars, while a large proportion is foreign to the subject treated. Might such extraneous matter be cut out?

These are the points to which I particularly invite the attention of this

Committee, and shall feel obliged for the sentiments of Members in this book, which will be my warrant for commencing volume VI. in a more regular and systematic form.

I would, at the same time, crave the sanction of the Committee to have thrown off, say 50 copies *monthly*, of the *Proceedings*, as published in the newspapers, with this alteration, that acknowledgements of letters, &c. be withdrawn from the copies destined for distribution. The expense of doing this would be very trifling, as any of the newspaper presses, having the type up, could strike off a number of copies; copies of these regularly despatched to the several Branch Societies throughout the country, to the Agricultural Committee of the Royal Asiatic Society, the Society of Arts, and other similar Institutions throughout the world, would tend, in my humble opinion, to keep up that interest in our *Proceedings*, which other means fail to produce.

It might lead others to do the same; and we should have one uninterrupted line of communication by which we should, at least, make others conversant with what we are about, if we failed to bring about a reciprocity of information, of which I have little apprehension.

I think it cannot be but admitted by all who have watched the rapid rise of this Society, that immediate publicity of our *Proceedings* in the Journals of this Presidency, and the speedy publication of its Transactions, have contributed more than any other means.

But the former are ephemeral and are soon lost sight of, if seen at all by Societies in distant countries; and the irregular transmission of unwieldy volumes affords evidence of our exertions at too great a distance of time. I would, therefore, beg leave to suggest the adoption of the measure above alluded to, in addition, of course, to the usual courtesy of presenting our volumes to Societies abroad and throughout India.

I will feel much obliged to the Members to afford me the benefit of their views on these subjects, as speedily as possible, as I have several papers to circulate immediately, which, if resolved to be published, must appear in volume v, which I hope will be laid on the table at the ensuing General Meeting of the Agricultural and Horticultural Society.

I have the honour to be,

Gentlemen,

Your obedient humble servant,

JOHN BELL,

Secretary.

23rd December, 1837.

Mr. Bell's suggestions appear to me very judicious, although his labours, as Secretary, will be greatly augmented by undertaking the useful task of curtailment of such papers as may require the process: I think we must thankfully accept of his liberal offer to that effect. Instances, of course, may occur, when entire letters require to be inserted in the Transactions, but the majority of communications to the Society will bear to be pruned of much that is irrelevant or mere points of form. I beg to submit that in these respects, we cannot have a better model for Transactions of our Society, than those of the Society of Arts at home.

With regard to extra copies of the Proceedings, I would even go a step further than Mr. Bell, and say, that instead of 50 copies only, we should have several hundred copies struck off, in order that Members might provide themselves, both for their own use, and for the benefit of their friends and correspondents. This would materially promote the useful object which Mr. Bell has explained; the expense would be a mere trifle, and on that very account I should be averse to leaving out in the extra copies, any thing whatever from the Proceedings as published in the newspapers.

N. WALLICH.

24th December, 1837.

I agree entirely with Dr. Wallich, in all that he has said on the proposition of Mr. Bell.

W. STORM.

I entirely concur.

W. K. EWART.

Communications published in the Society's Transactions, should be pruned of all superfluous and irrelevant matter. The only question is, how far we may alter the language employed by the contributors: we need not, of course, be captious about elegance of diction; but I think it would gratify the writers, as well as promote the credit of the Society, if uncouth phraseology were amended previous to publication. We are not a *learned* body; all the Members of which must be taken to possess a certain portion of literary acquirement, and many persons unaccustomed to commit their observations to paper, may be able to furnish us with information of great value. As to the copies of the monthly proceedings, I should like to know the estimated expense.

M. A. BIGNELL.

I agree with Mr. Bell as to the expediency of condensing and curtailing communications when published in the memoirs, and I think it would be right to give notice to contributors to omit much useless and irrelevant matter, and save us, in a great degree, the labour of doing it ourselves. In regard to copies of Proceedings as published in the Newspapers. I would say about 100 more than our number of subscribers, instead of 50.

W. CRACROFT.

DONATIONS AND PRESENTATIONS
TO
THE AGRICULTURAL SOCIETY OF INDIA.

From 1st January to 31st December, 1837.

By Sir Thomas Anbury.

Seeds of a superior description of Melon, grown at a place called "Koreeapur," about 10 miles from the station of Saugor.

By J. Ardall, Esq.

A yam of an unusual size, the produce of a garden at Cossipore.

By Colonel Bentson.

A sample of Coffee grown in his garden.

A complete treatise on the culture of Tobacco.

By the Rev. T. Boaz.

A specimen of South American Cotton.

By Capt. A. Bogle, Commissioner at Arracan.

Two quart bottles of Sandoway Tobacco seed.

By C. H. Blake, Esq. of Dhoba.

Samples of five qualities of Sugar, some Treacle and Rum.

By W. Blundell, Esq. Commissioner at Moulmein.

Samples of Cotton, the produce of Pernambuco Seed.

By M. A. Bignell, Esq.

Specimens of Lycopodium from California.

By E. Bentall, Esq. Magistrate and Collector of Dinagepore.

A piece of cloth made of Silk, spun by the worm which feeds on the castor oil plant.

By Mr. C. R. Bell.

A small sample of Cotton and Seed, as plucked from the plant, in its original wild state, growing on the Island of Orotonga, (one of the South Sea Islands.)

By Col. J. Colvin.

A maund of Upland Georgia Cotton, from American Seed.

By W. Cracroft, Esq.

Two folio volumes, containing a splendid collection of dried specimens of Plants and Shrubs, gathered in VanDieman's Land, also three samples of Caoutchouc.

By W. C. Crane, Esq.

Specimens of Cotton from Upland Georgia and Sea Island Seed, and specimens of Manilla Cotton.

By Dr. A. Campbell, Assistant to the Resident at Nepaul.

Eight specimens of soils of Nepaul.

A small quantity of Red and White Clover seed.

Two samples of Nepaul Maize, and a sample of Maize grown from American Seed.

Two samples of Janera, and a sample of the brown Corn of Australia, from acclimated seed.

Thirty-four specimens of Agricultural productions of the valley of Nepaul, and eight ditto, of the plains of Sarun and Tirhoot.

By Chas. De Verinne, Esq.

Samples of Sea Island, Upland Georgia, and New Orleans Cotton, grown at Calleepool, Jessore, from American seed.

By M. P. Edgeworth, Esq. Asst. to the Pol. Agent at Ambalah.

Seven varieties of the soil of that district.

A description of a Sugar-mill, termed "Kularee," used in that part of the country.

By F. T. Fergusson, Esq.

A French work, entitled "Histoire Naturelle des Oranges."

By J. W. Grant, Esq.

A small specimen of "Nurma," or "Chundera" Cotton.

By F. Harris, Esq. of Kishnaghur.

Some Cotton, the produce of Egyptian Seed.

By Dr. Hufnagle.

Some seed of grape and apple, accompanied by a plant of each.

A specimen of cleaned Cotton, from Upland Georgia seed, also a skein of twist made of it.

A catalogue of prizes and rewards dealt out by the Agricultural Society of Philadelphia.

A plan of the Agricultural Society's Nursery, as at present laid out.

Specimens of Upland Georgia Cotton in the pod, grown at Cossipore from American seed.

A maund of Indian Corn, from American seed.

By C. P. Holloway, Esq. of Singapore.

Some Cotton, cultivated in his grounds, in the Island, from Pernambuco seed.

By R. J. Homfray, Esq.

A short account of the wild Silk Worm, or Tussuck Pokah.

Two Apricots from his garden at Barripore, and a dried specimen of the Capillaire plant.

By Dr. Helfer.

A box containing a variety of specimens of Caoutchouc, and one of Gamboe, collected in the Tenasserim provinces.

By Dr. A. R. Jackson.

Library of Useful Knowledge, one volume. "Cattle, their diseases, breeds and management."

By Capt. F. Jenkins, Governor General's Agent at Assam.

A quantity of Cocoons of the Area Worm, and two pieces of cloth made from the Area silk.

By Rajah Kalikrishna Bahadoor.

A sample of "Arhur Dhall," and some seed of the same, grown in Zilla Tipperah, with a short description of the best mode and time of sowing it.

By R. Lowther, Esq. Revenue Commissioner at Allahabad.

Two bottles of acclimated Sandoway Tobacco seed.

By G. Leyburn, Esq. of Shahabad.

Some Cotton, the produce of Egyptian seed.

By J. W. Laidlay, Esq. Secretary to the Branch Society of Moorshedabad.

A few Mangoes, plucked from a tree, bearing two crops a year.

By R. Montgomerie, Esq. Magistrate of Azinghar.

A highly interesting statement, shewing the quantity of land under Sugar cultivation in that district, with an estimate of the quantity of Sugar manufactured in the last year.

By J. C. Marshman, Esq. in the name of the Author.

A copy of the Doctrines of the Ricardo, or New School of Political Economy, by Major W. H. Sleeman.

By D. McFarlan, Esq.

Some plants of the Fungus tribe.

By J. McClelland, Esq.

Three copies of a catalogue of "Objects in Natural History," collected by him in Assam.

By Major J. A. Moore, Assistant to the Resident at Hydrabad.

A tin box containing samples of the Potatoes grown there.

A ditto, three nonpareil apples, and some grafts of the tree from which they were taken.

By the Honourable W. H. Melville, Governor General's Agent at Moorshedabad.

A box of seed of the Teak tree.

Samples of Cotton from Upland Georgia seed.

By J. P. Marcus, Esq. of Naunsagur, near Arrah.

Two bottles of the Roosa Grass seed, and a small phial of oil distilled by him from the grass.

By Dr. Montgomerie, of Singapore.

A box and two bundles of Sugar-cane of two kinds, the produce of the Island.

A model of a rice mill in common use at Malacca.

By Mr. J. W. Masters.

A paper on the treatment of Peach trees.

A ditto, containing an analysis of the soils received from Dr. Campbell, at Nepalul.

By Col. D. McLeod.

Two parcels containing Melon seeds, one called the "Rock Melon of Saugor," the other "high flavoured Melon from Saugor."

By Capt. H. Macfarquhar, of Twoy.

A specimen of Hemp grown in his garden, from a few shoots received from Col. Burney, of Ava.

By D. F. McLeod, Esq. Asst. to the Governor General's Agent in the Nerbuddah Territories.

Specimens of three varieties of country Cotton, the "Munnooa,"

“Deo” and “Berar,” and a sample of Cotton, the produce of Egyptian seed.

By Capt. J. D. Nash.

A small quantity of Sea Island Cotton seed.

By H. Piddington, Esq.

A few heads of rice from Carolina seed.

A tabular view of the generic character in “Roxburgh’s Flora Indica,” compiled by the donor.

By Jas. Prinsep, Esq.

Sixteen specimens of Lichens.

By Mr. G. Pratt.

Ten different specimens of stick and shell lac.

By Sir Edward Ryan.

A paper, containing “Observations on the culture of Hops.”

By Lieut Rainey, Asst. to Commissioner of Arracan.

Two rice husking machines, a buffaloe plough, and specimens of Arracan black and red rice.

By D. B. Syers, Esq.

Sixteen maunds of Sea Island Cotton seed.

By Major J. D. Syers, Secretary to the Branch Society of Cuttack.

Samples of Cotton and Tobacco, from the Society’s Garden.

By Col. L. R. Stacy.

A sample of Pernambuco Cotton, and some varieties of Melon seed.

By W. Storm, Esq. on the part of Mr. Macarthur, of Kishnaghur.

Some specimens of Maize, from American seed.

By D. W. H. Speed, Esq.

Two samples of Maize from Jaunpore seed.

Two ditto of Red Desee ditto.

Two ditto of Yellow Desee ditto.

By E. Sterling, Esq.

Some seed of a superior kind of Orange tree, grown on the Island of St. Jago.

By the Secretary.

Bell’s Comparative View of the External Commerce of Bengal, for 1835-36, 1836-97.

Twenty-two seers of Guinea Grass seed.

Twenty-four quarts of Tobacco seed, the produce of a small quantity of seed received from Dr. R. Wight, of Madras.

Some brown corn, and several sorts of peas and beans, the produce of Cape seed.

Four bottles of English Clover seed.

A root of the Ole, from stock brought from the Persian Gulf.

By His Highness Nawaub Tohowar Jung.

A specimen of Cotton grown in his garden, from seed received from the Society.

A pod of Chocolate, also the produce of his garden.

By J. Vaupell, Esq. late Secretary to the Bombay Agricultural and Horticultural Society.

One hundred Mauritius Sugar-cane cuttings.

By H. Walters, Esq.

A specimen of Cotton, grown at Hooghly, from American seed.

By Dr. Wallich.

A bottle of Caoutchouc, made by the natives of Para.

A wooden model of the form in which the substance is made in South America.

A pamphlet on the cultivation of Cotton, by Dr. Lush, of Bombay.

A pamphlet "On the Growth of Plants without open exposure to the Air," by Mr. N. B. Ward.

By Dr. Wallich, on the part of Dr. R. Wight, of Madras.

A circular drawn up by Dr. Wight, on the preparation and introduction, on a more extended scale in India, of the Senna plant.

Copies of a circular by Dr. Wight, on the cultivation of Cotton in the Peninsula of India.

Copies of Mr. Ingledew's Treatise on the culture of the Cape Vine, Red Rose, &c.

By Dr. Wallich, on the part of Capt. F. Jenkins.

Specimens of Mozanhurry, Moogah and Area floss silk.

A sample of Creole Rice, and of Sugar manufactured at Gowhatti, by Mr. Grange.

Several rolls of specimens of the Bark of the "Uggur-gach," both in a prepared and unprepared state.

Six samples of Caoutchouc, prepared at Assam, under the direction of Lieut. Vetch.

Eight samples of Caoutchouc, prepared at Assam, under the direction of Dr. Scott.

By J. P. Wise, Esq. of Tipperah.

Two specimens of Tea, grown in the Tipperah Hills, and prepared by the natives for common use ; one sample is the leaf in its dried state, the other undergoing maceration with salt, in a bamboo, preparatory to use.

The Society is indebted to the following gentlemen, for having furnished replies to their circular of Agricultural queries :

To R. H. Mathews, Esq. of Dearie.

For information respecting the district of Shahabad.

To the Reverend Mr. Williamson.

For information respecting the district of Beerbhoom.

To Major J. R. Ouseley, Prin. Asst. to the Commissioner of the Saugor and Nerbuddah Territories.

For information respecting that part of the country.

To A. Ronald, Esq. of Duncaree, via Chuprah.

For information respecting the eastern part of the district of Goruckpore.

To R. Montgomery, Esq. Magistrate of Azinghur.

For replies furnished, together with a map of that district.

The following presentations have been received from other Societies :

From the Secretary of Arts.

Its Transactions for 1836.

From the Royal Asiatic Society.

Its Transactions, Journal, No. 6.

Copies of proceedings of the Committee of Agricultural and Commerce, for March, April and May, 1837.

From the Medico Botanical Society.

Address of Earl Stanhope, President of the Society.

Summary of Advertisements issued by the Agricultural and Horticultural Society of India, during the year 1837, offering medals and rewards for the undermentioned :

PREMIUMS FOR WORKS ON AGRICULTURE AND HORTICULTURE.

It having been resolved upon, at a Meeting held on the 12th April, 1837, that Premiums should be offered for the best works on Indian Agriculture and Horticulture, the following Resolutions, passed on that occasion, are advertized for general information.

1st.—For the best work on Indian Agriculture in all its branches, founded on experience in the country, to be presented to the Society, on or before the 1st May, 1840,

TWO THOUSAND RUPEES.

2nd.—For the best work on the Agriculture of Bengal, to be presented to the Society, on or before the 1st May, 1840,

ONE THOUSAND RUPEES.

3rd.—For the best work on the Horticulture of the Western Provinces, to be presented to the Society, on or before the 1st May, 1840,

ONE THOUSAND RUPEES.

CONDITIONS.

1st.—The Society reserves to itself the right of refusing to grant any of the above Premiums, if the works on the above subjects are not such as it approves.

2nd.—The Authors who may receive any of the above Premiums, shall, within six months after the receipt thereof, publish the Treatises to which such Premiums shall have been awarded, or the Society shall have the option of publishing, in case the Authors shall neglect to do so, within the time above prescribed.

Medals for encouraging improvement in the Staple Products of British India.

It having likewise been resolved upon, at a Meeting held on the 12th April, 1837, to award Gold and Silver Medals to the producers of the best Staple Products of British India, the Society is desirous of making

known the conditions under which the distribution of these Medals is to take place.

1st.—For the best sample of Muscavado or Raw Sugar, not less than two maunds,

THE GOLD MEDAL.

For the second best sample of Muscavado or Raw Sugar, as above,

THE SILVER MEDAL.

2nd.—For the best sample of Silk, not less than two seers.

THE GOLD MEDAL.

For the second best sample of Silk,

THE SILVER MEDAL.

3rd.—For the best sample of Cotton, raised from foreign seed, not less than two maunds,

THE GOLD MEDAL.

For the second best sample, as above,

THE SILVER MEDAL.

4th.—For the best sample of Tobacco, reared from foreign seed, not less than one maund,

THE GOLD MEDAL.

For the second best sample of Tobacco.

THE SILVER MEDAL.

CONDITIONS.

1st.—The articles exhibited by candidates for Medals, must be the produce of British India, the preference being given to the Bengal and Agra Presidencies, and their dependencies.

2nd.—The competition will be open to all persons whatever, European and Native, Zemindar or Ryut.

3rd.—The articles must not be culled from larger quantities, but be *bona fide*, the average of the produce of the land on which they are grown.

4th.—All candidates for Medals must deliver, along with their specimens, statements of the place where the articles *were* grown, the quality or nature of the soil, mode of cultivation, and of every cost.

5th.—*One-half* of the specimens declared entitled to the *Gold Medals*

shall be the property of the Society, the remainder will be returned to the candidates.

6th.—The candidates must affix to their specimens, a number or mark, and must forward to the Secretary a sealed letter, containing a similar number or mark, together with the name and address of the candidate; which letter shall not be opened till after adjudication.

7th.—When two or more samples appear to be of equal quality, the premium will be awarded to the sample which appears to have been raised at the least cost.

8th.—All candidates for Medals must leave their specimens in the hands of the Secretary of the Society, on or before the 1st May, 1838, and the Medals will be distributed on the 1st June following.

CATTLE.

Premiums and Medals for encouraging improvement in the Breed of the Cattle of India.

It having been resolved upon, by the Agricultural and Horticultural Society of India, that Premiums and Medals should be offered to encourage improvement in the breed of cattle in India; the following resolutions passed at a General Meeting on the 12th July, 1837, are advertized for general information:

For Cattle imported between the 1st January and 31st December, 1838, the show to be held on 1st February, 1839.

1st.—For the best imported Bull, not less than two years old, premium of 500 rupees and the Gold Medal.

For the second best, ditto ditto, a premium of 400 rupees and the Silver Medal.

For the third best, ditto ditto, a premium of 300 rupees.

2d.—For the best Woolled Ram, not less than two years old, a premium of 200 rupees and the Gold Medal.

For the second best, ditto ditto, a premium of 150 rupees and the Silver Medal.

For the third best, ditto ditto, a premium of 100 rupees.

3d.—For the best-bred Cow, imported from any part of the world, a premium of 250 rupees and the Silver Medal.

For the best Woolled Merino or Saxony Ewe, a premium of 100 rupees and the Silver Medal.

4th.—For the best produce of imported Cattle, half the above mentioned premiums, and the Gold and Silver Medals, will be given on the 1st February, 1840.

FODDER.

Premiums and Medals to encourage the growth of good Fodder.

5th.—For any person who shall shew a cultivation of 20 well-planted beegahs of the best Guinea Grass, on or before the 1st January, 1838, either in Calcutta, or in the Mofussil, a premium of 200 rupees and the Gold Medal.

For 10 beegahs of ditto ditto, a premium of 100 rupees and the Silver Medal.

For a maund of seed from such cultivation, a premium of 100 rupees.

For half a maund of ditto ditto, a premium of 50 rupees.

For five beegahs of the best Lucerne, a premium of 100 rupees and the Silver Medal.

For 2 beegahs of the best Clover, a premium of 100 rupees and the Silver Medal.

JOHN BELL,
Secretary.

Town Hall, Calcutta, July 18th, 1837.

SUGAR.

Premiums to be awarded by the Agricultural and Horticultural Society to encourage the importation of Otaheite Sugar-cane, and its cultivation in Bengal.

At a General Meeting of the Society on the 9th August, 1837,—the following propositions of the Sugar Committee were brought forward ;—and it was moved by Dr. Wallich, seconded by the President, and unanimously resolved,—that they be adopted.

1st.—That one rupee be offered for every full-grown Otaheite cane, or for every eight feet of cut-cane that may be imported from the Mauritius or other places beyond the continent of India, within the next eight months from this date, and that it be optional with the Society, to limit or extend their purchase, to, or beyond, 1,000 canes,—the money for such canes to be paid under a certificate of the Agricultural Committee, as to their vegetating powers, on examination, immediately after arrival, at the Honourable Company's Botanical Garden.

2nd.—That in addition to the premium of one rupee per each cane,—the *Gold Medal* be awarded to any individual who shall import as above, 200 full grown, full length Otaheite canes, on a quantity of cut-packed cane, equal to 1,600 running feet,—within the period notified in the first proposition.

3d.—That in addition to the premium of one rupee for each cane,—the *Silver Medal* be awarded to any individual who shall import as above, the second 200 whole canes, or cut-canes (packet) equal to 1,600 running feet,—within the period above described.

4th.—That a premium of Two thousand rupees, and the *Gold Medal* be awarded to any cultivator, who can exhibit, on or before the 1st January, 1839,—fifty regularly planted Bengal beegahs of Otaheite Sugar-cane, in the best condition and most advanced state of cultivation, and of at least six months standing in any part of Bengal, each plant to be four feet apart, and laid in holes 18 inches deep, after the West India plan of cultivation; on condition, that the first years produce be offered to the Society for purchase, and on condition that the cultivator allow the stoles to remain, the rattoons produced from such stoles being offered for sale to the Society at a price not exceeding two pice per full grown ratoon, or in the event of the above not being claimed, the sum of One thousand rupees with the *Silver Medal* be awarded for any quantity of cultivation not less than 25 beegahs, on the same terms or conditions as above, preference being given to the largest cultivation.

5th.—That it shall be incumbent on the competitors to transmit at their own expence, not less than twenty of their best canes to the Secretary, accompanied by a certificate under the signature of the nearest authority on honour,—that the cultivation is so many beegahs;—and the decision of the Sugar Committee will be received by the Secretary in evidence of the successful candidate.

Town Hall, August 9th, 1837.

CAOUTCHOUC.

The following resolutions proposed by the Caoutchouc Committee, and adopted at a General Meeting of the Society, on the 8th November, 1837, are advertized for general information.

Premiums for encouraging improvement in the mode of collecting and preparing Caoutchouc.

1st.—For the best specimen of Caoutchouc, the produce of Assam, not less than a maund, manufactured according to the mode adopted in South America, the specimen to become the property of the Society, on the price for the same, in the Calcutta market, being paid to the producer,

A PREMIUM OF 100 RUPEES.

2nd.—For the best specimen of Caoutchouc, the produce of Assam, not less than 10 seers, prepared over an earthen vessel, the specimen to become the property of the Society, without any allowance for value,

A PREMIUM OF 50 RUPEES.

3rd.—For the best specimen of Caoutchouc, the produce of any other part of India, in similar quantities, and prepared in the same manner,

PREMIA OF 100 Rs. AND 50 Rs.

The sample of specimens to be forwarded to the address of the Secretary before the 1st March, 1838, on which date they will be examined.

Memo.—Models of the block on which the London Caoutchouc Company recommend the *Gum* to be prepared, may be had on application, and the mode of preparing the Gum, will be found in the 4th volume of the Transactions of this Society.

JOHN BELL,
Secretary.

*Agricultural and Horticultural Society's Office,
Town Hall, Calcutta, November 21st, 1837.*

COLLECTOR'S REPORT,

FOR THE YEAR 1837.

(*Read 10th January, 1838.*)

IN submitting a statement of Receipts for the year 1837, I am happy to have it in my power to shew an increase, compared with the preceding year, of Co's. Rs. 2,678 11 9 ;—thus,

Total Receipts in 1837,	16,111	13	10
Total Receipts in 1836,	13,433	2	1

Increased Collection in 1837, Co's. Rs.	2,678	11	9
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While the amount disbursed, exceeds that of the year 1836, by Co's. Rs. 448 1 2 ;—thus,

Total disbursements in 1837,	10,188	14	11
Total disbursements in 1836,	9,740	13	9

Excess Expenditure in 1837, Co's. Rs.	448	1	2
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But this increased Expenditure is very trifling, and might reasonably have been expected to exhibit a more marked augmentation, in reference to the number of new members, who are entitled to their quotas of seed, gratis ; and it will be seen that in Mr. Villet's bill alone, the amount is 448 Rs. more, in the past than in the preceding year, and that this addition was not found adequate to the demand for vegetable seed, since a further supply was obtained from Messrs. Mackenzie, Lyall and Co., at an expense of 260 Rs.

The next heavy amount is in Advertisements, and for printing circular notices of premiums and medals, offered to a considerable extent. This is,

however, unavoidable, and has been confined in all cases strictly to the letter of resolutions adopted by the Society, and ordered to be printed for general information.

The Society's Transactions occupy a prominent place in the list of Disbursements, but it will be seen that this includes a reprint of vol. 1st, and the printing of the 3rd and 4th volumes of the Transactions, of which 500 copies have been struck off, in lieu of 300 copies as formerly. The addition of lithographed plans has assisted to swell this head.

The fixed assets compared with the account rendered last year, shew an increase of Rs. 5900 ;—thus,

Amount now in Government Agency Office, invested in

Government Securities, 19,000

Amount previously invested, as per account rendered in vol. 3d, 14,000

Increase, 5,900

Deduct, Captain Jenkins's premium, 500

Net increase of Society's funds, 5,400

This is the result of the past year's operations in the Collector's department, and I trust it will meet with the approval of the Society.

JOHN BELL,

Collector.

Calcutta, January 1st, 1838.

*Statement of Receipts and Disbursements from 1st January to
31st December, 1837.*

Receipts.

From Members, current and consolidated							
Subscriptions, collected from 1st January to 31st December, 1837,				Co. Rs.			
				9,499	3	9	
,, Government,—Annual Donation,				1,045	0	0	
,, Ditto, Monthly Allowance, for 12 months,				1,630	2	0	
				2,675	2	0	
,, Proceeds of Surplus Potatoes sold,				24	8	0	
,, Ditto of ditto Cape seed,				118	0	0	
,, Ditto of Society's Transactions,				172	3	6	
				314	11	6	
,, Estate of Messrs. Alexander and Co.—the 1st and 2nd Dividends, each at 3 per cent. on the claim of the Society, amounting to Sa. Rs. 24,783, 14 8,				1,586	1	9	
,, Ditto of Messrs. Colvin and Co.—the four dividends amounting in all 27½ per cent. on the claim of the Society, amounting to Sa. Rs. 279, 13 0,				82	1	0	
				1,668	2	9	
,, Messrs. Cantor and Co.—the premium put at the disposal of the Society by Capt. F. Jenkins, for the improvement of the Area Silk,				500	0	0	
,, The Government Saving's Bank.—Interest on Company's Papers,				970	0	0	
Total Receipts in 1837,				15,627	4	0	
Balance of Cash on 31st December, 1836,				484	9	10	

Grand Total of Receipts, Co's. Rs. 16,111 13 10

Disbursements.

SEEDS.

By Messrs. Gisborne and Co. for 15 casks and 14 barrels of Cotton Seed,	761	9	8
„ Messrs. Bagshaw and Co.; Amount of Mr. Villett's Bill for Cape Seed,	1,088	0	0
„ Mr. J. H. Hannay for Dinapore Gar- den Seeds,	300	0	0
„ Messrs. Mackenzie, Lyall and Co. for 40 packages of Garden Seed,	260	0	0
„ Mr. Arnold for Bulbs,	110	0	0
	<hr/> 2,519 9 8		

FREIGHT.

„ Mr. J. C. Roger, for 4 cases Ameri- can. Garden and Cotton Seed, previ- ously received. from Mr. Grant Thor- burn of N. York, per "W. Goddard,"...	23	3	0
„ Messrs. Macleod, Fagan and Co. for Cape Seeds per "Perfect,"	51	8	9
„ Messrs. Henley and Dowson, for cane plants shipped per "Vicissitude," and on which freight was declared to have been paid by them,	180	0	0
	<hr/> 254 11 9		

SOCIETY'S NURSERY.

„ Paid to Dr. Wallich,—Malee's wages, coolly-hire and sundry expenses, incur- red for cultivating the Society's Nur- sery, from the 1st January to 1st De- cember, 1837,	565	8	8
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MEDALS AND PECUNIARY REWARDS.

By Paid for Prizes and Rewards to Ma- lees, at the two exhibitions held in Ja- nuary and August, 1837,	334	0	0			
„ Ditto Mr. Millet, for raising Musk Melons,	200	0	0			
„ Ditto Messrs. Pittar and Co. for 12 Silver Medals,	144	0	0			
„ Ditto for 4 Silver Medals supplied by the Calcutta Mint,	72	0	0	750	0	0

ADVERTISEMENTS, &c.

„ Advertisements and petty bills for print- ing Notices, Circulars, &c.... ..	801	1	0			
„ Stationary, wax cloth, &c,	162	10	0			

ESTABLISHMENT.

„ Assistant's Salary, sircar's, peon's, and packerman's wages,	1,995	3	0			
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LIBRARY.

„ Paid for books for Society's Library,...	108	0	0			
„ Messrs. Cantor and Co.—an old Ba- lance against the Society,	40	1	1			
„ Petty charges, tin boxes, carpentering, &c.... ..	233	11	9			
„ Postage and Bangly charges,	200	2	0			
				3,540	12	10

SOCIETY'S TRANSACTIONS.

„ Englishman Press, for Reprinting 100 copies of Vol. 1.	450	0	0			
„ Serampore Press for publishing 3rd and 4th volume of Transactions,.....	1825	4	0			
„ Messrs. Tassin and Black, for lithogra- phed plates and pamphlet covers,	283	0	0			
				2,558	4	0

GOVERNMENT SECURITIES.

By Invested in Four per cent Notes, with			
current interest,	4,984	3	4
	<hr/>		
Total expenditure.....	15,173	2	3
Cash Balance on the 31st December, 1837,	938	11	7
	<hr/>		
Grand Total, Co's. Rupees,	16,111	13	10

Memorandum of the Society's fixed Assets.

Amount invested in Government Securities, lodged in
the Government Agency Office, at this date, Co's. Rs. 19,900 0 0

Interest, not ascertained.

O. and E. excepted,

JOHN BELL,

Collector, Agr. and Hor. Soc. of India.

REPORT
OF THE
AGRICULTURAL AND HORTICULTURAL SOCIETY
OF INDIA.
FOR THE YEAR 1837.

(Read 10th January, 1837.)

IN concluding its Report upon the Proceedings of the year 1836, the Society expressed a hope that the Public would be enabled to trace very satisfactory progress, that they would be satisfied with what had been done, and that they would cordially unite their efforts, towards advancing the future prospects and views of this body.

The Society has now the pleasing duty to confirm the realization of this hope to the fullest extent, by the most solid proofs that can be afforded, viz. increase in the number of its Members, and a rich augmentation of its funds, with a corresponding increase of interest in the objects of the Association, verified in three volumes of its Transactions, published within the last twelve months.

The first, and most essential point, to which the attention of Members is called, is that of Finance ;—and the Society refers with satisfaction to the statement of the Collector, which has been read at the meeting this day, exhibiting a sum of Co's. Rs. 16,111 13 10 collected, being Rs. 2,678 11 9 in excess of the amount realized during the year 1836, or, deducting the surplus expenditure in 1837, a net increase of Rs. 2,230 10 7 remain~.

Some heavy items appear in the Disbursements of 1837, especially under the head of printing charges ; but it will be borne in mind, that these were absolutely called for, as a means of collecting information, and circulating far and wide the offer of such inducements, as were deemed calculated to excite a spirit of enquiry and emulation in the field of Agricultural Improvement ; and the funds of the Society could not be more legitimately and usefully employed than in prosecuting and encouraging this object.

The next subject of interest, is the accession of Members, and the Society is happy to announce that the number of elections registered since the last Anniversary, exceeds the *aggregate* (not the average) of 5 preceding years ;—thus,

Members elected in	1832	19
„ „	1833	11
„ „	1834	13
„ „	1835	44
„ „	1836	59*

Total Elections in 5 years,	146 Members.
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Elected in 1837,	148
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In following up the question noticed in the last Report, on the ratio in which attention has been attracted to Agriculture, by the different classes and denominations of our Indian Society ; we obtain this result.

* Not 69, as printed in Italics in the Report of last year. The comparative inference there drawn, will show that *Sixty-nine* is a typographical error.

	Elections from 1st May to 31st De- cember, 1836.		Elections from 1st Ja- nuary to 31st Dec. 1837.		Result in 1837.	
	Num- ber.	per centage.	Num- ber.	per centage.	In- crease.	De- crease.
Civilians and others in Civil Em- ploy,.....	11	24½	41	27¾	3½	0
Military,	5	11	17	11½	½	0
Merchants and others engaged in Trade,	2	4½	36	24½	19½	0
Law Officers,	0	0	5	3½	3½	0
Indigo planters and others en- gaged in Agriculture,	13	29	21	14	0	15
Native gentlemen of rank and opulence,	2	4½	9	6	1½	0
European members of no particu- lar profession,	2	4½	0	0	0	4½
Clergy,	2	4½	2	1½	0	3½
Honorary Members,	3	7	1	¾	0	6½
Medical Men,	5	11	16	11	0	0
	45	100	148	100	0	0

It is a subject of real gratification to find so great a proportionate in-
crease, in the list of Mercantile names, and sure evidence of the in-
separable interests of Agriculture and Commerce.

The Society hopes to see the favourable improvement in the per-
centage of Native Gentlemen steadily progress, though as regards their
interest in the soil and wealth, it ought to augment ten thousand fold.

The Indigo Planters exhibit a *comparative* decrease, although the num-
ber of elections in 1837, exceeds those of 1836. Let us hope that they
will come forward with their funds, if not with information, for with the
command of Capital, this Society can do much,—without it, nothing.

While the Society records any accession of Members, it is bound to
record also resignations, the number of which in the course of the year
amounts to *three* only, viz. G. J. Siddons, Esq., C. S; Lieut. Meik, and
Mr. Hamerton. The first named gentleman is leaving India for ever;
the second, was going to some distant station; and the third, was pre-
vented from want of time to attend to its proceedings;—but this defi-
ciency is overbalanced by the return of several old Members from Eu-
rope, whose names are not included in the list of increase.

But all these most favourable indices of the Society's increasing pros-

perity, popularity, and utility, are damped in the painful duty it has now to perform, of alluding to the loss it has sustained by the death of some highly talented and respected members, during the past year.

The Rev. and Venerable Dr. Marshman was one of the few, who met in this Hall, on the 14th September, 1820, for the purpose of establishing a Society, of which his fellow-labourer, Dr. Carey, was the honoured founder; and he lived to see his exertions in connexion with those of his Colleagues, crowned with eminent success, since it is at this moment the most numerous, and well calculated to become one of the most important and useful institutions in India. Dr. Marshman, from first to last, laboured both by contribution and example, to attach others to the cause in which he took a zealous part. The death of this amiable man is recorded with feelings of deep regret.

Sir Benjamin Malkin, had not been many months a member, before death deprived the Society of one, whose talents were so eminently calculated to shed a lustre on this body.

The Society has also to record the deaths of Dr. Bramley, Colonel Cobbe, John Stewart, John Swinhoe, and J. C. Wilson, Esquires.

From this notice of a melancholy, though inadequate tribute of respect to the memory of Members, who have been separated from an interest in its proceedings, the Society would now turn to a cursory review of the principal objects that have engaged its attention during the past year, and to the additional demonstrations of the growing interest which has been attracted to the improvement of our Agricultural Resources.

In its last Report, the Society had the gratification of recording the names of six Branch Societies established within the year, 1836, viz. at Bangalore, Meerut, Hooghly, Burdwan, Beerbhoom, and Singapore.

This last year has enlisted six more Auxiliary Institutions, viz.

1. An Agricultural Society at Midnapore, F. Campbell, Esq. Secretary.

2. An Agricultural Society at Moorshedabad, J. W. Laidlay, Esq. Secretary.

3. An Agricultural Society at Cuttack, Major J. D. Syers, Secretary.

4. An Agricultural Society at Commillah, J. Davenport, M. D. Secretary.

5. An Agricultural Society at Azimgurh, R. Montgomery, Esq. Secretary.

6. An Agricultural Society at Assam, Lieut. H. Bigge, Secretary.

If to these be added the Societies of Madras, Bombay and Lucknow, the total number of Societies, including that of Calcutta, will be *Sixteen*; and a still more gratifying result is obtained in the reflection that all these Institutions are linked in harmony, and in one common cause.

In the early part of 1837, circulars containing a series of Agricultural queries were printed, and forwarded to the several Branch Societies, to Members, and other individuals known for the interest they take in these pursuits, throughout every part of India;—and the Society is indebted to the following gentlemen for having already supplied much valuable information:—

To R. Mathews, Esq. of Derie, for information respecting the district of Shalabad.

To the Rev. Mr. Williamson, for replies furnished with reference to the Beerbhoom District.

To Major J. R. Ouseley, Principal Assistant to the Commissioner of the Saugor and Nurbuddah Territories, for replies furnished with reference to that part of the country.

To A. Ronald, Esq. of Dunearee, via Chuprah, for information conveyed, regarding the Eastern part of the District of Goruckpore.

To R. Montgomerie, Esq. Magistrate of Azimglur, for replies furnished, together with a Map of the District.

It is the intention of the Society to have this mass of interesting information classified and thrown into a condensed tabular form, which it is thought will be more acceptable as a ready reference, when more returns shall have been received,—and the Society takes this opportunity of offering its best thanks to those gentlemen who have already contributed their quota, and to express a hope, that others who have received copies of its circular, or may desire to have copies, will come forward and enable the Society to add, during the ensuing year, to its Transactions, a document which cannot fail to be highly interesting.

The Society's attention has been turned especially to the improvement of objects of Husbandry and Commerce,—and Premiums and Medals to a large amount have been offered with a view to promote these objects.

The following is an abstract, without specification of conditions, which will be found in the notices advertized for general information, and in circulars printed and distributed in English and the Vernacular languages.

<i>Date.</i>	<i>Names of Objects.</i>	<i>Amount.</i>	
1837.		<i>Co's. Rs.</i>	
April:	For the best work on Indian Agriculture in all its branches,... ..	2,000	
	For Ditto, on the Agriculture of Bengal, ...	1,000	
	For Ditto, on the Agriculture of the Western Provinces,... ..	1,000	
		<hr/>	4,000
April.	For the best Samples of Sugar, Silk, Cotton, and Tobacco,—Four Gold Medals,—at an assumed value of 120 Rs. each Medal,	480	
	For the second best Ditto, of the above ar- ticles,—Four Silver Medals,—at an assum- ed value of 18 Rs. each Medal,	72	
		<hr/>	552
July.	For imported Bulls, 1st, 2nd and 3rd best.	1,200	
	For ditto Rams, Ditto,	450	
	For the <i>best</i> Bull and Ram, a Gold Medal each, in addition,	240	
	For the 2nd <i>best</i> Bull and Ram, a Silver Ditto each,	36	
	For the <i>best produce</i> of imported Bulls, half the above amount,	600	
	For the <i>best produce</i> of imported Rams, do,	225	
	Gold and Silver Medals, as above,... ..	240	
	For the best bred Cow, imported from any part of the world,	250	
	and the Silver Medal,	18	
	For the best woolled Merino, or Saxony Ewe,	100	
	and the Silver Medal,	18	
		<hr/>	3,377

1837	For a cultivation of 20 Beegahs of the best		
July.	Guinea Grass,	200	
	and the Gold Medal,	120	
	For a ditto, of 10 ditto, of ditto, ditto,...	100	
	and the Silver Medal,	18	
	For a ditto, of 5 Ditto, of the best Lucerne,	100	
	and the Silver Medal,	18	
	For a ditto, of 2 ditto, of the best Clover,	100	
	and the Silver Medal,	18	
	For a Maund of Seed from the Guinea		
	Grass Cultivation of 20 Beegahs, '... ..	100	
	For $\frac{1}{2}$ a Maund of Ditto, from do., of 10 do.,	50	
		<hr/>	824
August.	For 100 Otaheite Canes, imported from the		
	Mauritius, or other places beyond the Con-		
	tinent of India,	1,000	
	For the <i>first</i> importer of 200 Canes, the		
	<i>Gold</i> Medal, (in addition to a Rupee per		
	Cane,)	120	
	For the <i>second</i> importer of the same num-		
	ber,—the <i>Silver</i> Medal, (Ditto,)	18	
	For any individual who can exhibit a plan-		
	tation of 50 Beegahs of Otaheite Cane,		
	on, or before the 1st January, 1839,	2,000	
	and the Gold Medal,	120	
		<hr/>	3,258
November.	For a Maund of the best Caoutchouc, the		
	produce of Assam, manufactured accord-		
	ing to the South American mode,	100	
	For 10 Seers of Ditto, the produce of ditto		
	prepared over an earthen vessel,	50	
	For the best Specimens of Caoutchouc, the		
	produce of any other part of India, in si-		
	milar quantities, and prepared in the same		
	manner,		
	Premia of 100 Rs. and 50 Rs.	150	
		<hr/>	300
	Total Co's. Rupees,		12,311

The intrinsic value of medals is here assumed, for the sake of placing before the public, the sum of money that has been voted away, and to show that the funds of the Society are not locked up, for the sake of hoarding an unprofitable Capital. Reduced a few years ago, to a state bordering upon bankruptcy, it was absolutely necessary to *create* a fund, which has been happily effected within a very brief space, and the members will be enabled to judge, whether the Society husbanded the nucleus of its Financial Resources up to too late a period, with reference to the many Premiums it has undertaken to award.

This statement will also serve as a guide to members, in bringing forward motions involving large outlay ; how far it will be prudent to do so, both with reference to the present and future ; and a Society of such magnitude and importance, as this is likely to prove, ought always to have a reserve fund of certain amount, that no motion can touch, without which, its prosperity and stability are constantly exposed.

In the printing department great progress has been made. During the present year vol. 4th of the Transactions has been published, and vol. 5th (if not laid upon the table to-day) will be very shortly out of press. These volumes contain many interesting papers ; the most important of which are a Report on the Physical condition of the Assam Tea plant, with reference to geological structure, soil and climate, by John McClelland, Esq., Assistant Surgeon, Bengal Establishment ; and a report on the Tea plant of Upper Assam, by W. Griffith, Esq., Assistant Surgeon, Madras Establishment, presented to this Society by the Supreme Government.

A paper on the Agriculture and Rural Economy of the Valley of Nepal, by A. Campbell, Esq., Officiating Assistant to the Resident, and presented to this Society by Government, is an exceedingly interesting document, and well worthy of perusal.

Some highly interesting papers received from the Committee of Agriculture and Commerce of the Royal Asiatic Society, on the subject of Lichens, have been published, together with plates presented by Dr. Robert Wight, of Madras.

Several interesting communications on *Cnouthouc* have been printed, which will serve to shew the time and to whom the country is indebted for the introduction of this new source of wealth.

References made by this Society, to public bodies in England, will, in all probability, draw out much valuable information regarding this ar-

ticle, and will form an acceptable accompaniment to the documents already published.

The offer of Medals and Premia for the importation of Otaheite or Mauritius sugar-cane, has not been attended with success as yet ; but the Society is happy to intimate, on the Report of the Nursery Committee, that the specific object, for which a spot of ground was kindly lent by Dr. Wallich, has been now attained, viz. for the rearing of superior cane for distribution throughout the Lower Provinces ; and the Committee assure the Society, that they will very soon be able to make up for past disappointment, brought about by circumstances, over which they had no control.

Since the publication of the last Report, a continued distribution of Cotton seed, therein alluded to, has been followed up, and many Reports on samples will be found in the Transactions. It must be borne in mind, however, that this last year has been a season, unfavourable from great drought, to this plant in particular, and that the want of rain cannot be more fully established, than in the appalling fact, that the scarcity of water is *already* felt, in the vicinity of Calcutta, in so much, that private tanks are carefully guarded ;—what must it be, when a lapse of months must take place, before the thirst of millions can be quenched ?

The numerous questions now submitted to this Society, suggested the subdivision of labor, and Standing Committees have been elected, to report upon various subjects ; these Committees are as follow :—

- | | |
|--------------------------------|------------------------------------|
| 1. Cotton Committee. | 5. Caoutchouc and Oil Seeds ditto. |
| 2. Silk, Hemp, and Flax ditto. | 6. Improvement of Cattle ditto. |
| 3. Sugar ditto. | 7. Implements of Husbandry and |
| 4. Coffee and Tobacco ditto. | Machinery ditto. |

An addition to the number of Members on the Committee of Papers, and Nursery Committee, has likewise been made.

The nucleus of a Library of reference has been formed, and the Society is indebted to some of its Members for donations of books ; and to Societies abroad for various volumes and parts of their Transactions. The Society would take the liberty to suggest to Members, who may leave this country, that they would further the objects of the library greatly, by bestowing such works, as may be useful, rather than allow them to be sacrificed at auctions.

A resolution has been passed, by which a greater degree of regularity

is now observed in the proceedings of the General Meetings, viz. that of requiring motions made by Members to be registered and read, when submitted, and brought forward at the next monthly meeting, when parties absent may have an opportunity of either supporting or opposing them.

A revision of the Society's rules has been ordered, and is now under consideration by the Committee of Papers.

The Society has the pleasure to record its acknowledgements to the Committee of Agriculture and Commerce of the Royal Asiatic Society of Great Britain and Ireland, for a series of its proceedings; and takes this opportunity of congratulating that highly gifted and influential body, on the appointment of a Committee, the scene and objects of whose solicitude, are so intimately connected with the labours of this institution; and the Society fervently hopes, that by a cordial co-operation with the Committee of Agriculture and Commerce, the interests of both will be substantially advanced.

Before closing this brief review of the most important objects that have occupied the attention of the Society during the past year, it would be unmindful of what is due, were it to overlook the obligations under which it lies to the continued support of the Honourable East India Company, and no greater proof can exist of the warm interest taken in the amelioration of our Indian staples by the Honourable Court, than in the volume of Reports on Cotton Wool, Raw Silk and Indigo, published "by order of the East India Company in December, 1836, a volume containing such a mass of valuable and authenticated information, as at once to set at rest all supposition of lukewarmness, in what so deeply affects the best interests of the country; and the Society from this evidence, in connexion with the favourable opinion which the Honourable Court have been pleased recently to express in a despatch to the Supreme Government of its efforts, is strong in hope, that its endeavours will be seconded, and substantially supported, in whatever great measures it may hereafter undertake.

To the Supreme Government, the Society is also indebted for the prompt manner in which its wishes have been met, in respect to directing the transmission of periodical returns of grain, from the District Magistrates and Collectors, and to these Functionaries who have regularly

forwarded returns, in compliance with this requisition, the Society desires to express its thanks.

That the Society has not been in a condition, until now, to do *much good*, a reference to the state of its finances 3 years ago will fully demonstrate.

That it has lost no time in applying its newly acquired resources to the most useful purposes, has been shewn in an early part of this report; and that it will continue to do so to a less limited extent, must be equally manifest.

But it is scarcely necessary to remind Members, that the welfare and prosperity of the Society are in their hands, and much will depend upon their individual aid and influence, as well as upon their steady co-operation collectively, in promoting a continuance of the extraordinary success, which has attended the labours during the past year, of the AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

Proposed by Mr. Cracroft, seconded by Dr. Wallich, that both the Collector's Report, and Annual Report be adopted.

Proposed by Dr. Wallich, seconded by Mr. G. A. Prinsep, that the special thanks of the Society be given to Mr. Bell, for having drawn up these Reports.

It is to be regretted that the Manuscript copy of Dr. Campbell's Notes forwarded to the Press, was very carelessly and inaccurately written in one of the Government Offices at Calcutta, and the distance between Nepal and this Presidency precluded the author from correcting the Press, which will account for the numerous errors that have appeared.

ERRATA

In Mr. Campbell's Notes on the Agriculture of Nepaul, from the 4th Volume of the Transactions of the Agricultural and Horticultural Society of India.

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|------|-----|------|-----|--|
| Page | 60, | line | 9, | after <i>intervene</i> , erase <i>in</i> . |
| — | „ | — | 17, | after <i>acres</i> , erase <i>as</i> . |
| — | „ | — | 18, | to <i>operation</i> , add <i>s</i> . |
| — | 61, | — | 26, | after <i>is</i> , introduce <i>supposed to be</i> ; and for <i>pluces</i> , write <i>place</i> ; and for <i>the</i> , write <i>its</i> . |
| — | „ | — | 27, | for <i>deities</i> , write <i>deity</i> ; for <i>images</i> , <i>image</i> , and for <i>are</i> , write <i>is</i> . |
| — | 62, | — | 2, | for <i>Bishomutti</i> , read <i>Bishunmutti</i> . |
| — | „ | — | 26, | for <i>Gankurun</i> , read <i>Gaukurun</i> . |
| — | 65, | — | 11, | for <i>Gankurun</i> , read <i>Gaukurun</i> . |
| — | 66, | — | 10, | for <i>though</i> , read <i>through</i> . |
| — | „ | — | 28, | for <i>Bishomutti</i> , read <i>Bishunmutti</i> . |
| — | „ | — | 29, | for <i>the</i> , read <i>their</i> . |
| — | 68, | — | 1, | after <i>this</i> , add <i>the valley</i> . |
| — | „ | — | 5, | for <i>even</i> , read <i>Even</i> , and put <i>a</i> at <i>sand</i> . |
| — | 70, | — | 7, | from the bottom, for <i>first</i> , read <i>finest</i> ; and last line erase <i>whenever found</i> . |
| — | 71, | — | 12, | after <i>my</i> , write <i>own</i> ; and to <i>observation</i> , add <i>s</i> . |
| — | 74, | — | 11, | for <i>ground</i> , read <i>grand</i> . |
| — | „ | — | 20, | after <i>or</i> , write <i>seed</i> ; and penultimate line after <i>not</i> , write <i>however</i> ; and after <i>suit</i> , write <i>it</i> . |

- Page 75, line 13, for *juna's*, write *jaua's*.
 — „ — 14, for *jana's*, write *jaua's*
 — „ — 16, for *jana*, write *jaua* ; and in penultimate line, for
officers, read *offices*.
 „ Note 2nd, for *composition*, read *comparison*.
 — 77, line 3, for *Jahyah*, read *Gahya* ; and penultimate line, af-
 ter to, write *drill*.
 — „ Note 3, after *rice*, insert *from one root* ; and for *the*, read
this ; after *variety*, insert *Each root* ; and for
throughout, read *throws out*.
 — 78, line 14, for *puttis*, read *pattis*.
 — „ — 23, after 20, erase to 30.
 — „ Note 2nd, erase *appendix*, and read pp. 44, 45.
 — 81, line 3, for *so*, write *do*.
 — 82, In heading of the first column for *Bigah*, read *Bi-*
gahs ; and at line 4 from the bottom, erase the
 note mark.
 — 83, — 17, after *Khets*, insert *and*
 — 84, in first line of note for *following*, read *fallowing* ; and
 in next line, erase *it*.
 — 86, — 13, after *dimensions*, read *taking*
 — 87, — 22, after *are*, insert *not* ; and line 31, for *their*, read
our ; and instead of the note, insert *see p. 48*.
 — 88, — 2, for *rise*, read *rises* ; and for *has*, read *have*.
 — 90, — 12, from bottom after *been*, insert *already* ; and erase
in the body of these notes.
 — 92, — 5, after *it*, insert *is* ; after *dissolved*, erase *in*, and write
Prussiate.
 — 93, Penultimate line for *best*, read *test*.
 — 96, — 6, after *weight*, insert *thus it is*.
 — „ — 20, for *each*, read *card*.
 — „ — 30, after *grains*, write *this last*.
 — 97, — 12, for *wheats*, read *weights*.
 — 98, line 2, for *Maras*, read *Mashas*.
 — „ — 10, from the bottom, for 1-5th, read 1-15th ; and next
 line for *quart*, read *quarter*.
 — 99, — 15, for *Detachi*, read *Aitach* ; and in line 1, of Note
 2nd, for *mun*, read *muri*.
 — „ — 2, for ditto ditto.

- Page 101, line 2, the paragraph beginning *The second* has reference to *Touli* not to *Anundi Malsi*.
- „ — 5, for *Toulis*, read *Touli*, and erase it.
- „ — 16, for *stalk*, read *stock* ; for *All*, read *all*.
- 105, — Penultimate line, for *germiniferous*, read *grame-niferous*.
- 106, — 1, for *occasionally*, read *also* ; and in line 2, after *valley*, add *the latter thrives well in both these situations*.
- „ — 10, erase *nectarine*, and on margin opposite line 24, write *Referred to at p. 29*.
- 109 — 8, for *effected*, read *affected*.
- „ — 17, for *light*, read *high*.
- 110, — 5, after *been*, insert *already*, and erase *the body of* ; and at line 8 from bottom, for *alone*, read *only* ; in note at bottom of this page, for *manners*, read *manures*.
- 113, — 20, after *into*, erase *the* ; and after *in*, erase *the*.
- 114, — 14 to 20, to be marked as a quotation.
- 115, — 6, for *stand*, read *slanting* ; and line 9 after *the*, insert *first*, and line 11 to *digging*, add *s*.
- 116, — 27, for *lands*, read *hands* ; and line 32, for *practical* read *partial*.
- 117, — 15, after *for*, insert *the* ; and line 4 from the bottom, after *first*, erase *of*.
- 118, — 5, after *of*, insert *the* ; and line 23, for *almost*, read *about*.
- 119, — 9, for *had*, read *has*.
- 123, — 16, for *four*, read *fore*.
- 125, — 1, for *sowings*, read *sowing* ; and line 21, for *ouse* read *ours*.
- 126, — 26, for *sink*, read *sinks*.
- 128, — 15, for *only*, read *principal* ; and line 25, after *It*, insert *is*, erasing *it*.
- 130, — 24, after *sursoo*, insert *lands*.
- 131, — 6, after *Thrown*, insert *up*.
- 132, — 6, for *Terui*, read *Temi* ; and line 22, after *of*, erase *the*.
- 144, — 17, after *reckoning*, insert *corresponding*.

- Page 148, line 1, for *burberry*, read *barberry*.
 — 153, — 7, from bottom, for *and*, read *it*.
 — 154, — 17, for *Mayars*, read *Magars*; and for *or*, read *and*.
 In note I of this page, line 2, after *thing*, insert
 less at the; line 11, for *towards*, read *forwards*;
 line 12 after *and*, insert *attached*; and line 14,
 after *when*, insert *slit*.
 — 155, — 9, after generally, erase *if*; for *Mayars* read *Ma-*
 gar; and line 11, for *valley* read *valleys*; and
 for *recedes*, read *recede*; line 26 for *Mewar*
 read *Newar*.
 — 151, — 21, for *Chikowsa*, read *Chikousa*.
 — 159 — 4, from bottom, after *aulah*, add (*Phylanthus embli-*
 ca) and line 3, for *pachuki*, read *panchuki*.
 — 162, — 11, for *bundle*, read *handle*.
 — 163, — 24, after *modes*, insert *of threshing*.
 — 164, — 23, for *their*, read *thin*.
 — 166, — 2, for *Yarai*, read *Turai*, and at foot of p. 108 erase
 Note 2nd.
 — 170, — 19, for *widths*, read *width*.
 — 171, Note 1, for 1 *Rupée* and $\frac{1}{2}$ *anna*, read $12\frac{1}{2}$ *annas*
 — 174, No. 14, for *wearing*, read *wearing*.

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